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'80 housing systems

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STATISTICAL PANORAMA

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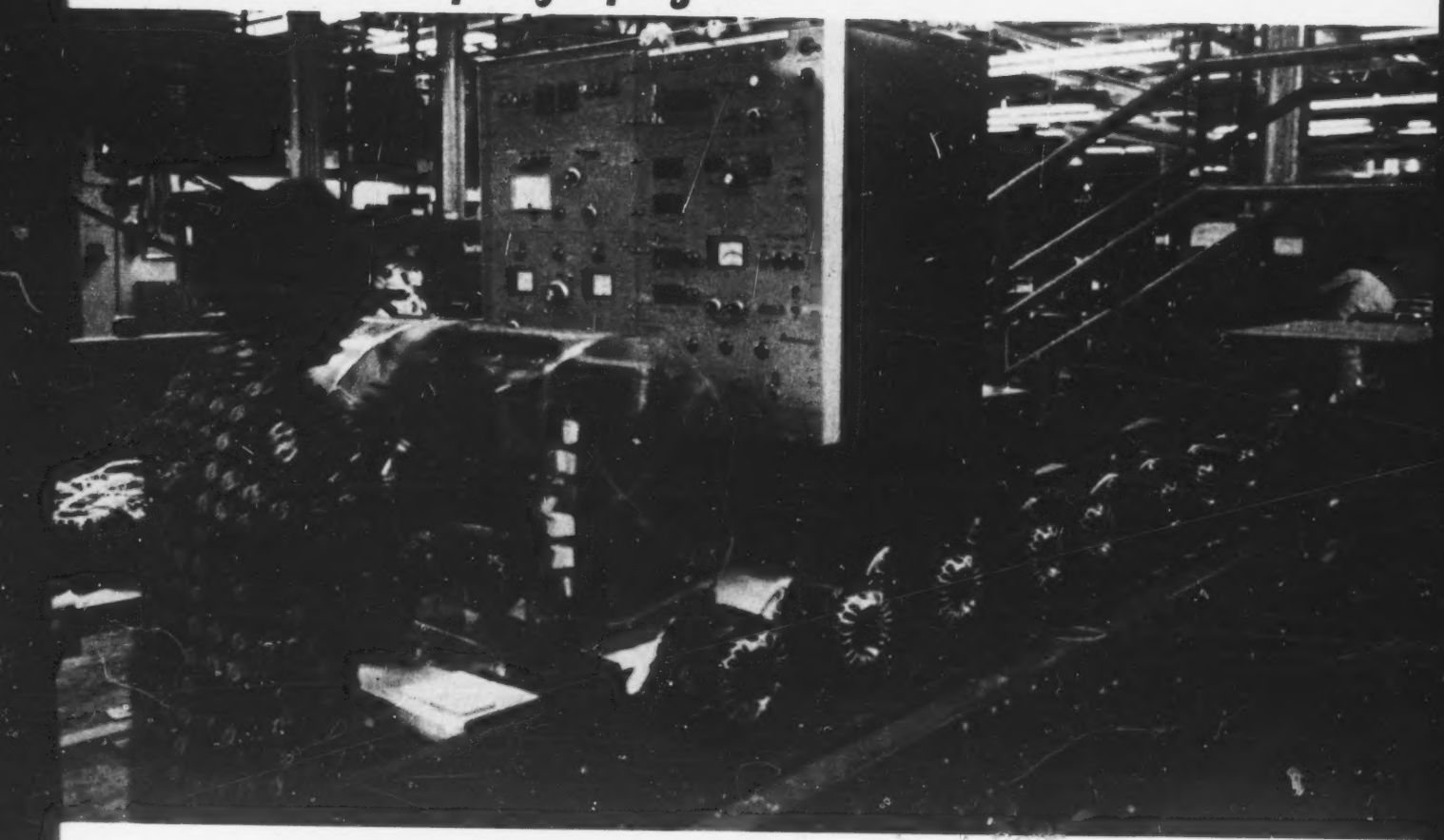

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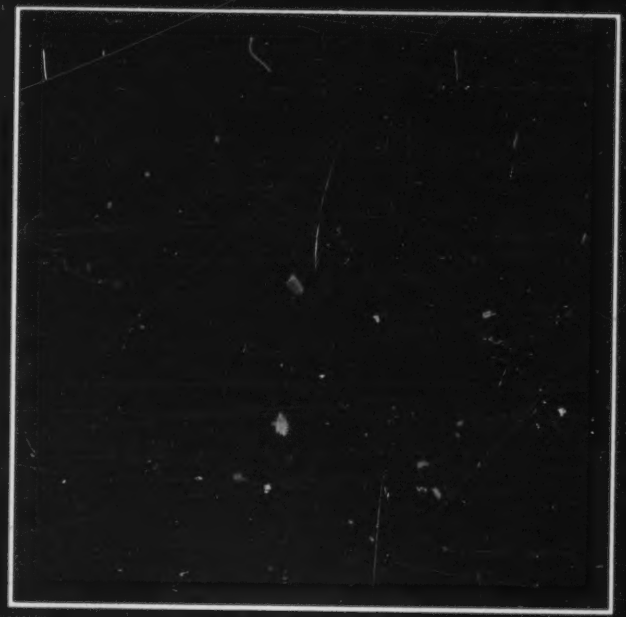

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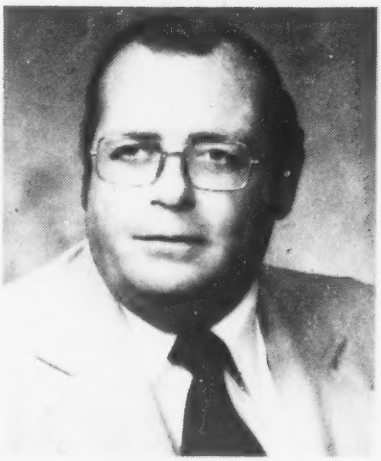
Editor's comment

Making statistics interesting for contractors and wholesalers



Gordon D. Duffy

Although this is the 16th year The News has presented Statistical Panorama, it is only the second year for this magazine-style format. And it's the first year we've dropped those Roman numerals. Now you'll know it by the year of publication.

The statistics used to be all national in scope and were mostly of interest to manufacturers. But we changed all that. In hopes of interesting contractors and wholesalers into making their own local market surveys, we have again included breakdowns for four regions and, this year, 40 individual cities.

In addition to the relationships between housing starts and the saturation of comfort systems and fuels, we have continued to indicate our assessment of how many of the industry's major products are shipped into a particular city in an average year. And for 25 of those cities, we have included fuel cost comparisons.

Also in this issue, starting on page 8, is a product-by-product analysis that includes both the numbers and our thoughts about the changes — or lack of them. Deeper into the issue we also talk about comfort trends, housing, wholesalers, energy, share of market, replacement sales, labor, and how we're doing in world markets.

During the past year there has not been much dramatic growth to talk about. But even so, and with increasing rapidity, there are shifts in emphasis caused by new products, concepts, and fuel cost relationships. It's our commitment to you to provide this vital information necessary for survival.

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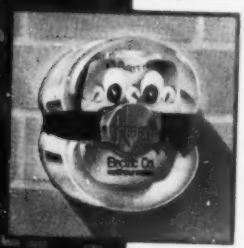

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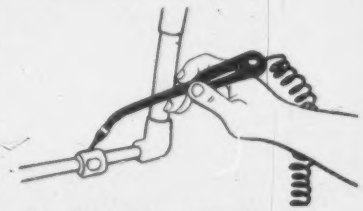

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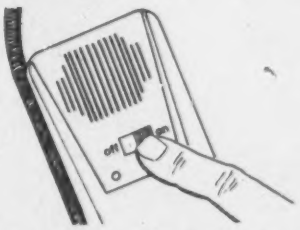

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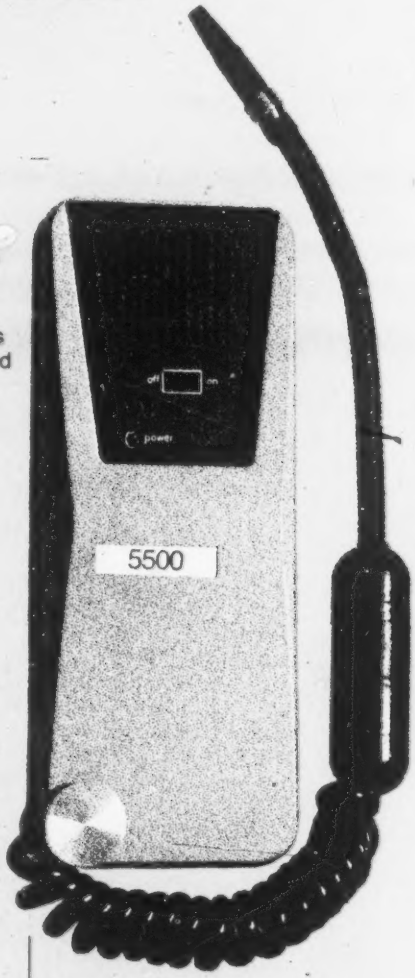

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STATISTICAL

by Gordon Duffy

In this expanded section, and in the added sections which follow, we look at the industry from a national perspective. But national markets are just the sum of a multitude of local experiences. On page 35, we have tried to translate these national events into terms of how they apply — differently — to 40 residential markets.

Forecasts

Unitary air conditioner shipments, despite a prolonged heat wave last summer, dropped 19% in 1980 to 2,168,000 units. The villains of the piece were housing starts, which toppled 14% in 1979 and another 26% last year, and prohibitive interest rates that cut into add-on sales.

The experience of 1980 should be about the modern-day bottom. But because housing will only bounce back by a bit, and because interest rates will continue to be too high, look for only a 6% increase to 2.3 million units this year. Inventories are lean — and are expected to stay that way.

Furnace shipments showed traditional characteristics last year and declined by 25%, or in almost perfect step with the experience in housing. We expect furnaces generally to advance about 8% this year to 1,875,000 units on the strength of gas units and a slight boost in housing. Oil and electric units will continue to slide a bit more.

Chiller shipments were given a powerful boost by the continuing strength of the U.S. large office building market and continuing strength abroad. Chillers will not be able to repeat last year's 24% growth, however. In fact, the extra growth in the centrifugal market likely will be offset by some slippage in reciprocating units. Look for a flat year.

Boiler shipments in residential sizes were up 11.5% last year, largely because of the continuing strength of gas-fired cast iron units. We expect activity in this market segment to continue at last year's high level, helped in large measure by the replacement of oil-fired units.

Heat pumps, despite their close association with new housing, did not slip as badly last year because of strength in the commercial sector. A weakening light commercial market and only a modest increase in housing point to a flat year for heat pumps, which still are riding at about four times 1973 levels.

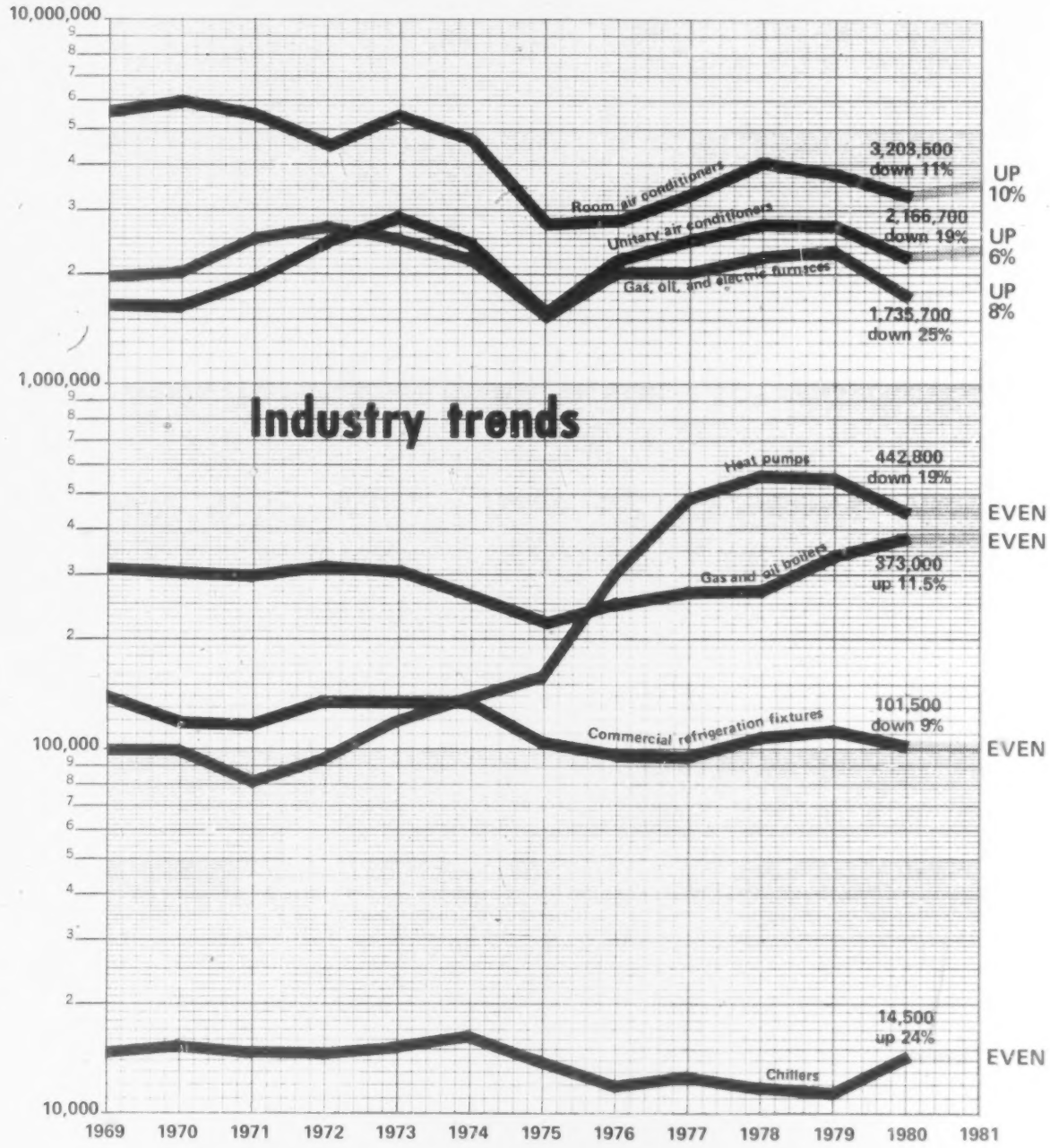
Room air conditioner shipments dropped 11% last year despite the summer heat wave. Many of the extra sales came from the substantial inventory that is this market segment's trademark. There are signs that the pipeline is refilling and an increase of 10% in 1981 room unit shipments (to 3.5 million units) may be conservative if the summer is hot.

Commercial refrigeration equipment shipments showed surprising strength by only dropping 9% last year despite ultra-high interest rates and low profits in the supermarket industry, which held back both new construction and remodels. This market will struggle to hold even in 1981.

Electronic air cleaner shipments, hurt by the trend among inflation-embattled consumers to cut back on the purchase of durables, dropped by nearly 16% last year to 160,000 units. In this market, too, holding even with 1980 experience may be a struggle.

Power humidifier shipments continue to be hurt by the drop in new home starts and a hesitancy on the part of consumers to spend money on durables while inflationary demands weigh so heavy on food and fuel budgets. Last year's 9.5% drop to 440,000 units should, however, be near the bottom of the cycle and shipments should flatten in 1981.

PANORAMA



1981 in perspective

Although the anticipated upturn in the nation's economy arrived on schedule last year, it arrived with heavy feet. The change was barely perceptible. The nation continues to be buffeted by interest rates held artificially high by a largely unsuccessful federal monetary policy aimed at inflation.

Perhaps frustration is the word that best describes the industries served by this newspaper. The very conditions that brought about a 10% decline in overall industry activity last year — and hold-the-line policies in 1981 — effectively camouflage a proven demand for residen-

(Next Page, Please)

1981 in perspective . . .

(Continued from Preceding Page)

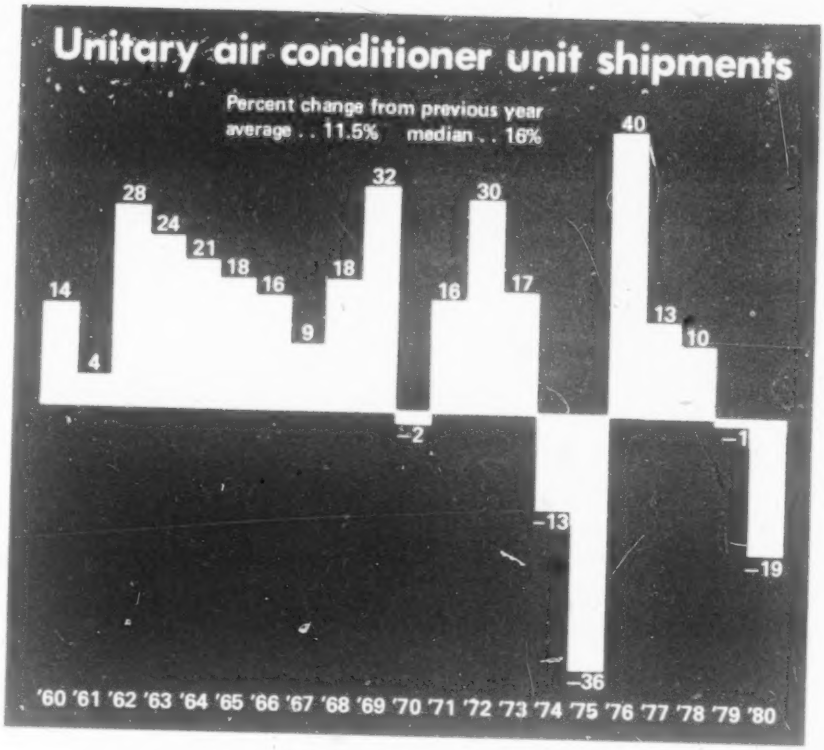
tial, commercial, and industrial construction markets of boom proportions.

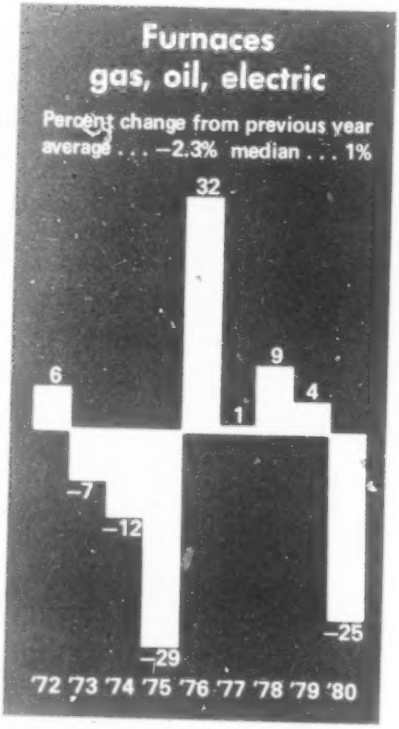
This frustration is made harder to bear by the knowledge that renovation and energy conservation markets, which normally would blossom in a lackluster construction climate, also have been held back by the twin spectres of inflation and high interest rates.

Hope stems from the certainty that this pent-up demand will not evaporate as Congress wrestles with President Reagan's program of budget and tax cuts geared to stimulate private sector expansion — in 1982 and beyond.

If the President's approach is successful — and most agree that it is the only viable cure on the horizon at the moment — the problems of these and other industries will be the happier ones of competing for the capital needed to move forward quickly.

It might be noted, however, that such a broad-based move away from the starting gate would put additional pressures on the inflation rate and would invite more interference from the Federal Reserve Board. A major consolation, however, would be reduced federal activity in the nation's money markets.





Our markets

In real terms, overall industry activity declined by about 10% last year even though, in some major markets, the drop was twice that much. The reason, clearly, was the distortion in inventories caused by economic conditions.

Looking at general markets, the large commercial market showed strong gains again last year and, largely because of the infusion of foreign money, should gain a bit in 1981. The mid-sized commercial and institutional markets should hold steady but the light commercial and industrial markets, which sagged in 1980, probably will slip a bit more this year. Commercial refrigeration, too, will drop this year but not as much as in 1980.

Unitary air conditioning shipments, which plateaued within hailing distance of 1973's record in 1978 and 1979, dropped 19.2% to 2,166,714 units last year, or about twice the decline expected. A widespread and prolonged heat wave last summer at the tail end of the production year, however, resulted in an inventory reduction of more than 250,000 units — units which, because of the high cost of borrowed money, manufacturers and distributors have elected not to restore to the pipeline.

This means, then, that the reduc-

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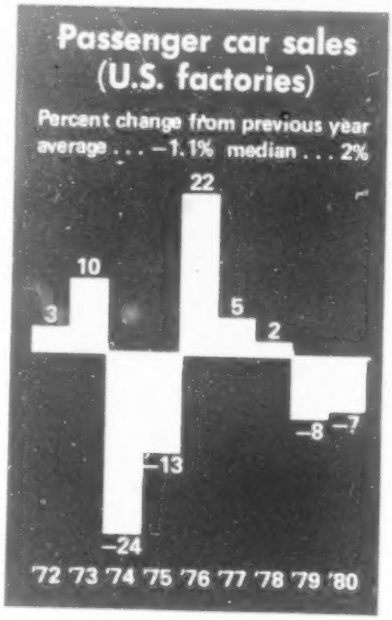

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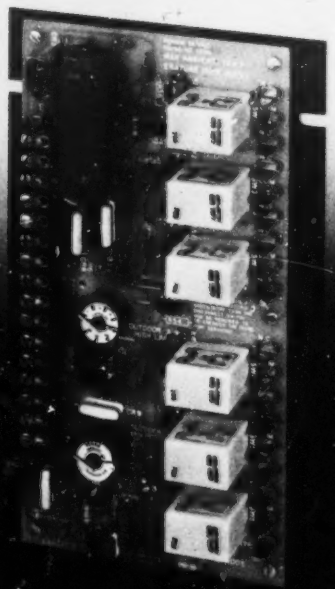

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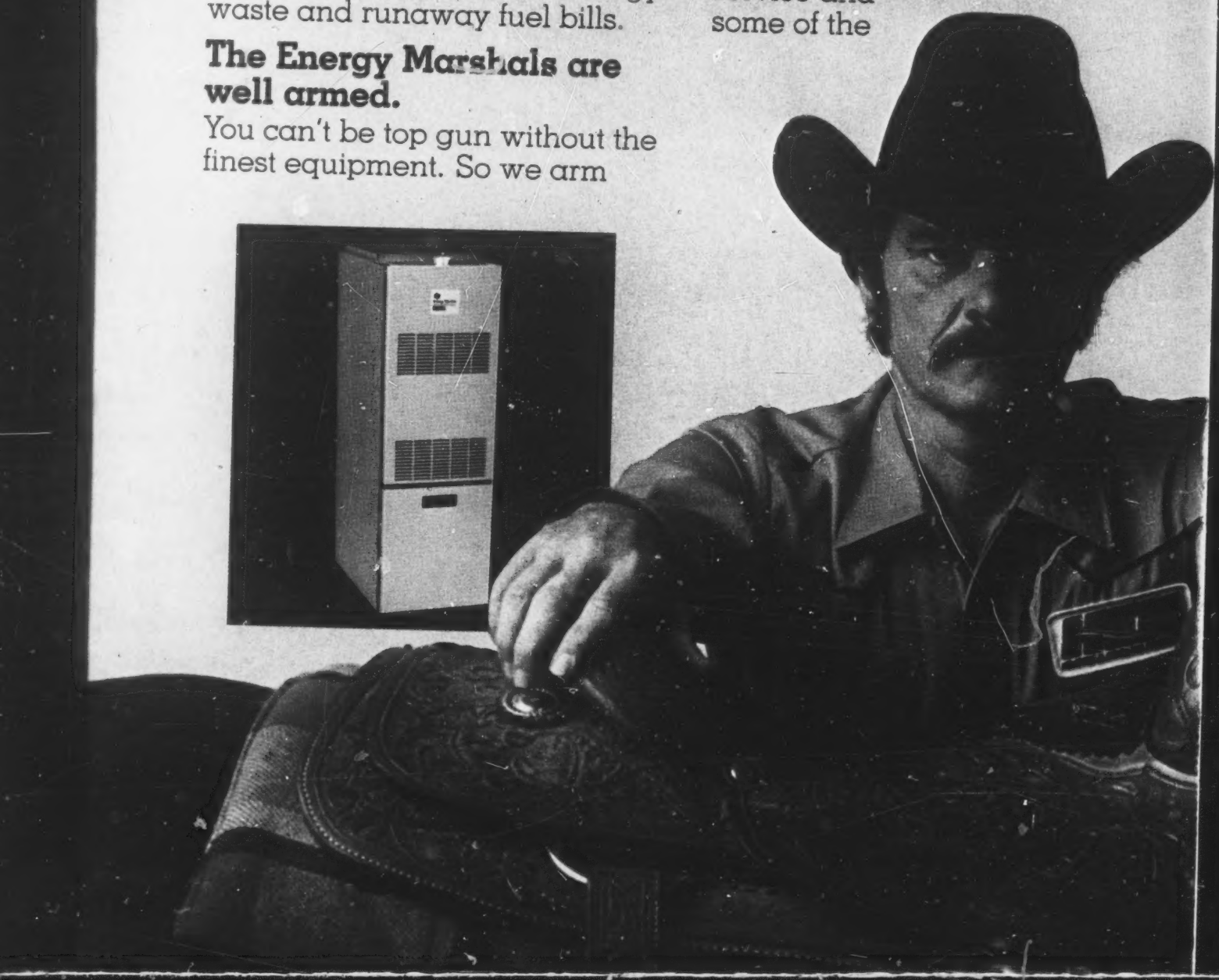

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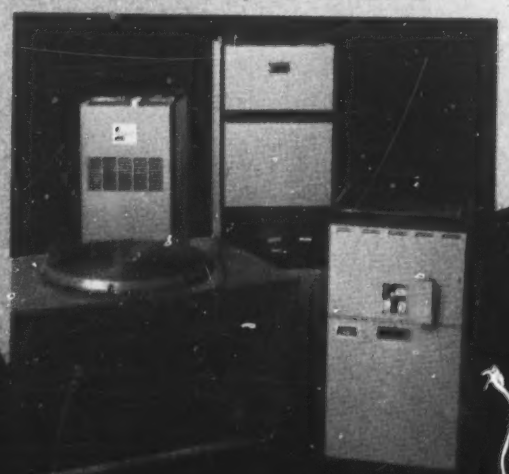


HEATING & COOLING PRODUCTS

1981 in perspective . . .

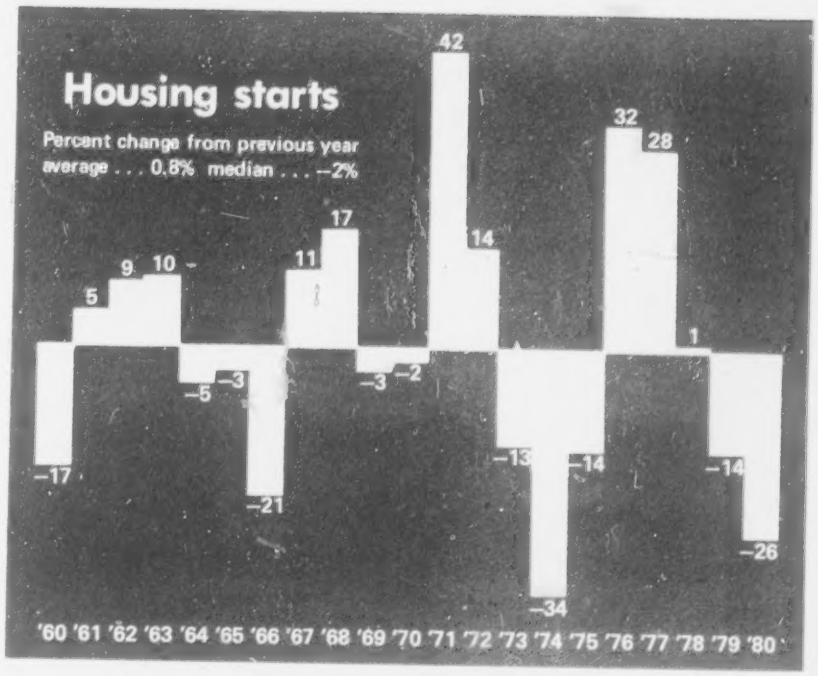
(Continued from Page 10)

tion in installations by contractors was more like 10%, a fact that tracks well with the experience of wholesalers, distributors, room air conditioners, and even refrigerators. A slight upward turn in housing, together with steady increases in replacement sales and a few inventory replacements, should increase unitary shipments this year to 2.3 million units. Another heat wave, of course, could add to that total -- and tie knots in the distribution chain.

Shipments of heat pumps, which are largely a new construction product, dropped 19% to 442,829 units last year despite a 26% drop in new home starts. Heat pumps, which were installed in 24% of new single-family homes last year despite the easy availability of natural gas, should hold even in 1981 at 450,000 units. Additional gains can be expected from water-source and packaged terminal air conditioners in a heat pump configuration.

This year will also mark the first real market test of air-to-water heat pumps as domestic hot water heaters. This embryonic product is aimed at a market that regularly absorbs 2.5 million water heaters using electric resistance heat.

On the heating side, fuel shifts are readily apparent. Although residential boilers were up overall by 11.5%, oil's share tumbled from half of shipments in 1977 to a 15% share last year. And while gas furnaces declined 22% and electric furnaces declined 19% in response to the drop in housing, oil furnace shipments took a precipitous 60% slide last year.



Oil-fired equipment will continue to drop in 1981, even if not so sharply, but all other heating equipment should advance marginally.

A two-year tally of fuel prices compiled by the U.S. Department of Labor as part of the cost-of-living index shows that, from November, 1978, to November, 1980, fuel oil prices rose from 53.3 cents/gal to $1.022/gal. During the same period, natural gas rose from 30.4 cents/therm to 41.6 cents/therm and the average cost of electricity rose from 4.6 cents/kWh to 6.1 cents/kWh.

These prices are broken down regionally and for 25 individual cities elsewhere in this issue. They do not reflect the latest round of price increases, including the escalation of oil prices to $1.25/gal.

The exclusive availability again this year of figures which allow us to measure comfort heating-cooling-fuel penetration by region for homes built in the previous year (see Comfort in Construction) again underlines the importance of southern markets:

- More than 46% of all homes completed in 1980 were in the south where 84.5% of all single-family and 95.5% of all multifamily homes were equipped with central air conditioning. Heat pumps also captured a 33.8% share of the south's heating market, nearly 4% more than gas.
- The penetration of central air conditioning into homes built across the U.S. in 1981 was 62.6% for single-family and 84.4% for multifamily units. National heat pump penetration was 24.3% for single-family homes, down a hair from 1979 experience.
- Electricity continued to be the dominant fuel in single-family homes at 50.5%, half of them heat pumps, but gas accounted for a

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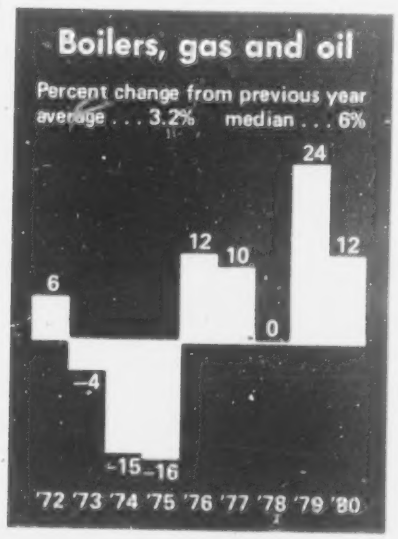

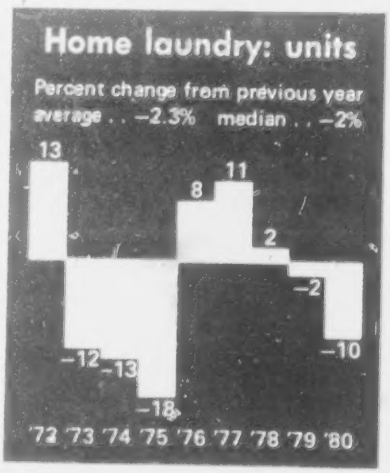

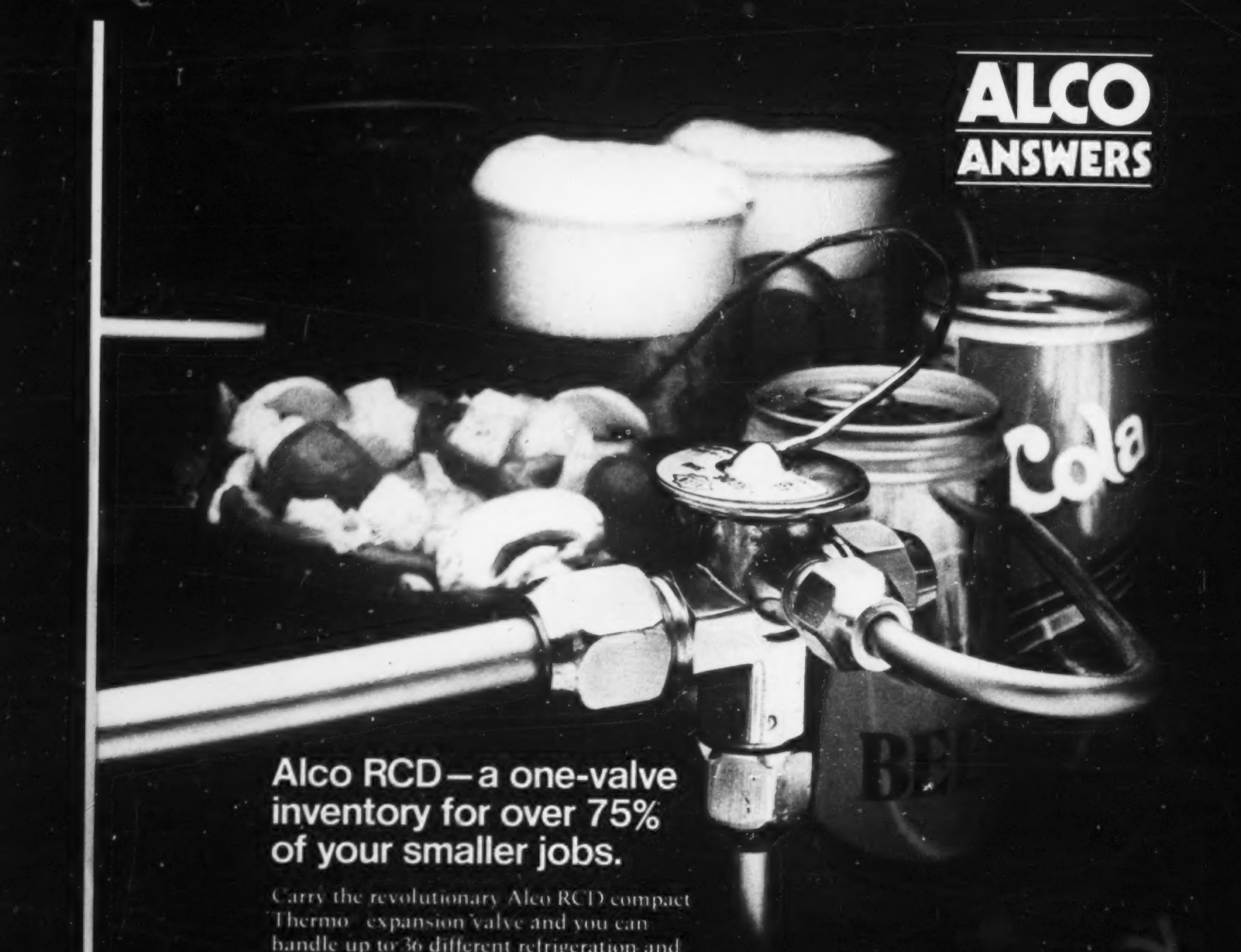

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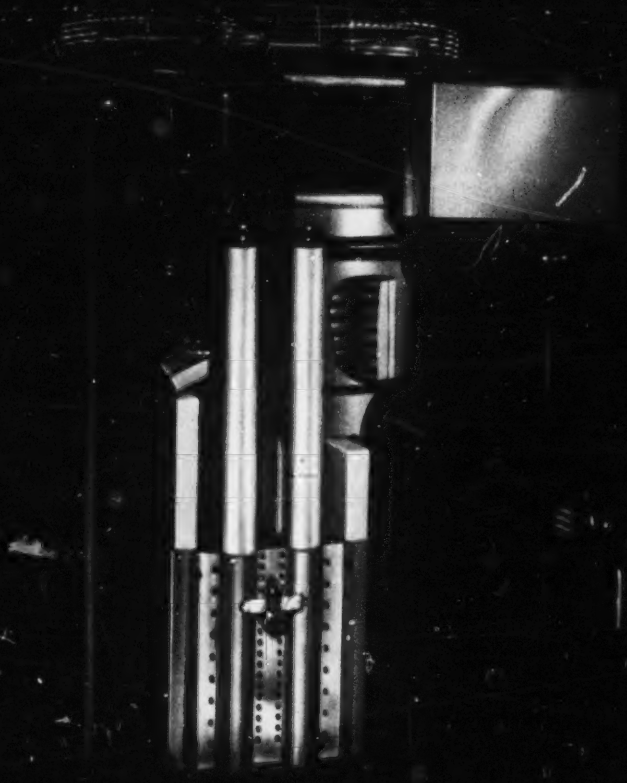
*10 YEAR NO SWEAT WARRANTY

Durable unibody construction and tough weather-resistant finish



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Efficient chrome lined generator eliminates the need for a compressor

Solution pump contains the only three moving parts in the sealed refrigeration unit

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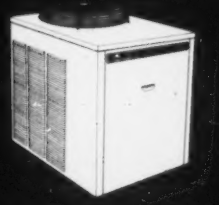
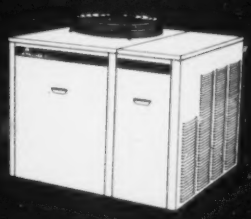
Arkla Servel gas airconditioning offers more than just a single quality product. We offer opportunity. The opportunity to increase your airconditioning sales. Our full range of product lines face virtually no competition. They're versatile enough to meet any customer demands. And they're backed by a full sales program from finance thru incentive trips. That all adds up to a class by itself.



Chillers

The Arkla Servel line of chillers now ranges from a new two-ton model up to 10 tons. And they're available for a wide range of applications—from a simple add-on coil to multiple unit, zone control complexes. Economy and reliability remain built in to each chiller.

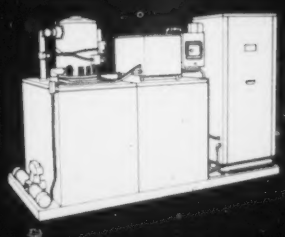


Chiller/Heaters

Our series of chiller/heaters are true hydronic units supplying either chilled or hot water on demand. Designed for outdoor installation, they're adaptable for either commercial or residential applications.

Multi-Use Packaged Chillers

With capacities from 10 through 25 tons of chilled water, the line offers multiple staging of capacity for economy of operation in comfort cooling or process cooling applications . . . all on cost saving, single phase power wiring.



Solar Equipment

Arkla Servel complements its airconditioning line with an innovative solar airconditioning/heating system, pre-engineered in a single package.

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1981 in perspective . . .

(Continued from Page 14)

41.2% share. Oil slipped to a 3% share.

Accessories such as electronic air cleaners and power humidifiers did not do especially well last year, mainly because of the lower discretionary income available and fewer home starts. The aftermarket in flue dampers, however, was estimated at half a million units, most of them thermal units.

Conservation

Even though Federal Trade Commission-mandated labels and fact sheets showing relative residential equipment efficiencies have been in effect for a year, the promised minimum efficiency standards for residential heating-cooling equipment and major home appliances may never be issued.

The Department of Energy was to have issued the regulations by the end of 1980 but asked for more time in which to completely overhaul its original proposal. In the meantime, President Reagan put the regulations on hold and has promised severe spending cuts for that department of DOE.

Insulation levels of U.S. homes are being upgraded continuously and there are indications that a high percentage of oil burner replacements were for the sake of efficiency rather than breakdowns. More than half of the states now require spark ignition on gas appliances and a few require flue dampers.

ARI reports that residential central air conditioners with an EER (energy efficiency ratio) of at least 7.5 accounted for 36% of all residential unit shipments in 1978. This portion moved to 44% in 1979 and, probably, it will top 50% in 1980. All major and most smaller manufacturers offer units with efficiencies at or above that level.

Modulation of large chillers and variable air volume (VAV) air handlers in new and existing buildings took on new importance last year because of new equipment availability. One study estimated that energy conservation amounted to a $3.5-billion market in 1980 and is escalating at a 14% annual rate. In supermarkets, for example, 96% of new stores and 50% of renovation jobs feature heat reclaim from the refrigeration equipment.

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Air conditioning

The lengthy and widespread heat wave of last summer did much to reduce inventory, excess and otherwise, but it contributed little to annual unitary shipment totals. The result is that both OEM's and distributors will enter the summer cooling season this year playing their marketing cards close to the vest.

Total shipments in 1980 declined by 19.2% to 2,166,714 units when compared to the previous year's total shipments of 2,680,597 units, according to the Air-Conditioning and Refrigeration Institute (ARI). If the more than quarter-million unit reduction in inventory were added to the shipment figures, the drop would have been only half as large. But if there had been no heat wave, the decline could have been 25% or more.

These figures do not include 210,000 air conditioning units and air-to-air heat pumps shipped to foreign markets in 1980, up 86% over the 113,000 units exported in 1979. These ARI figures include only units shipped directly to overseas markets by OEM's and include few, if any, units shipped by distributors or contractors.

Of the 2,680,597 units shipped in 1979, about 22% — or 590,000 units — were for commercial applications and 78% — or 2,090,000 units — were for residential applications. If this 78%-22% split holds true for 1980 experience, 475,000 units destined for commercial applications were shipped last year and 1,692,000 units destined for residential applications.

The unitary category includes electric air conditioners, gas air conditioners, air-source heat pumps, and rooftop equipment. It does not include packaged terminal air conditioners (ptac's), room air conditioners, or the fast-growing water-source heat pump category.

Inventory

The inventory of unitary air conditioners at the end of 1980 was 616,000 units, or 28.4% of shipments. This compares with 849,000 units or 31.7% of shipments at the end of 1979. Although this 10.4% drop in numbers from one year to the next represents a reduction of 233,000 units from inventory, it might also be noted that the end-of-1980 value is outside of the 30% to 33% of shipments considered normal prior to 1974.

Of the total inventory, 49% was at the factory at the end of last year and 51% was at the distributor level. This is in keeping with prior-year experience even though distributors reduced inventory by 130,000 units during the past year compared to a reduction of 100,000 units by manufacturers.

An indication of capacity mix for 1980 unitary air conditioners — and how it compares with 1972 experience — follows:

	% 1972	% 1980
Under 1.8 ton	16	10.3
1.8 ton to 26,999 Btu/h	23	19.7
2.25 ton to 32,999 Btu/h	17	18.4
2.75 ton to 38,999 Btu/h	22	22.5
3.25 ton to 43,999 Btu/h	6	7.6
3.67 ton to 53,999 Btu/h	7	8.7
4.5 ton to 64,999 Btu/h	6	8.2
5.4 ton to 96,999 Btu/h	1	1.7
8.1 ton and larger	1	2.9

When comparing the year-to-year shifts from 1979 to 1980 in these ARI-supplied figures, the most dramatic increase was a 24.1% hike in the number of units with capacities in excess of 53 tons (to 1,667 units). A 12% increase was recorded in the number of 26- to 30-ton units shipped (to 2,604) and shipments of units of from 15 to 20 tons increased by 7.7% (to 6,923 units). The biggest declines — up to 31% — were in

shipments of units ranging from 3.25 to 4.5 tons.

Of the total 2,166,714 units shipped last year, 7,260 — or 0.34% — were water-cooled. All of the rest used air-cooled condensing. This category does not include water-source heat pumps, which are classified separately, and numbered 84,000 units last year.

Looking ahead, we expect unitary air conditioner shipments to increase by about 6% to 2,300,000 units in 1981. If inventory levels are counted, however, this would be a drop of 100,000 units from the 1980 end-market experience, primarily because of a reluctance by both OEM's and distributors to challenge today's ultra-high money costs with any more inventory than they feel is essential.

The modest increase will come from a small increase in housing, continuing strength in large unitary equipment, and continuing increases in the repair-replacement market.

Installed value

The installed value of unitary air conditioning equipment put in place in 1979, the latest year for which figures are available, was $5.93 billion, up 7.3% from the $5.53 billion in 1978, according to ARI.

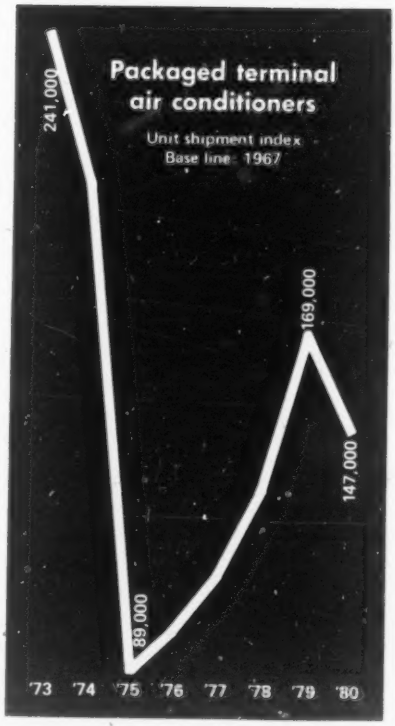
Commercial installations accounted for $1.94 billion of the total in 1979 and residential installed value amounted to $3.99 billion, according to estimates compiled by ARI's Business Research Department from information supplied by manufacturers.

Installed value covers the cost of unitary air conditioning equipment as shipped from the factory together with labor, ductwork, registers and grilles, thermostatic and other controls, electrical wiring, and other components of the system which are installed by the contractor.

The installed value of field-engineered air conditioning systems put in place in 1979 was estimated at $2.44 billion, an increase of 18% over the 1978 figure of $2.06 billion.

The combination of the two installed value figures for 1979 was $8.37 billion for all air conditioning put in place in the U.S. with the exception of room air conditioners. This represents an increase of 10% over the 1978 total of $7.60 billion.

In determining the installed value of field-engineered systems, ARI estimates that only 7.5% of the cost of the system is represented by the refrigeration machine. The remaining 92.5% represents air-handling equipment, labor, ducts, pipes, controls, and all other installation costs.



Ptac's

Packaged terminal air conditioner (ptac) shipments, which recovered steadily from a steep 1974-1975 plunge until 1979, dropped 13% last year to 147,000 units from a revised 1979 figure of 169,000. The 1978 figure was 132,000.

The recovery of ptac's was, in large measure, a reflection of the recovery of the office building, nursing home, and hotel-motel markets. High interest rates hurt all of these markets last year.

Ptac's are self-contained refrigeration cycles capable of being combined with a heating source, usually electric resistance heat or hot water coils, in the same through-the-wall cabinet. A growing number of ptac's over the past three years are being built in a heat pump, rather than in a straight cooling, configuration.

In fact, The News feels that at least a third of last year's 147,000 units were heat pumps and that most, if not all, of the decline was in straight cooling-electric resistance heat units.

Heat pumps

The air-to-air heat pump, the glamour product of the late 1970's, proved it was susceptible to economic law in 1979 when shipments recorded a modest 2% drop to 547,694 units. That proof came again last year when unitary heat pump shipments dropped another 19% — the same as for all unitary products — to 442,829 units.

The reason for the decline was twofold. A faltering housing industry hampered severely by high interest rates and a lack of confidence among inflation-buffeted consumers must be considered the prime reason. Total private housing starts declined 26% last year and single-family starts declined by 28.6%.

The other prime reason is the increased availability of natural gas as a home heating fuel. Until 1980, there was no evidence that renewed gas availability had had a marked effect on heat pump shipments. But that effect, however modest, began to show last year.

Penetration statistics on new single-family homes completed in 1980 supplied by the Bureau of Census (see Housing in Construction) showed that, although 1980 heat pump penetration slipped by only a percentage point overall, 5% drops in the north central and southern regions were significant. The south, for example, accounted for 47.5% of all single-family home completions last year. And although statistics do not show heat pump penetration in the multifamily home market, there is no reason to believe this market fared differently.

The air-to-air heat pumps included in the unitary statistics supplied by ARI do not include all heat pumps made in the U.S. To these numbers should be added ptac's in a heat pump configuration, water-source heat pumps — two categories which increased shipment levels last year — and room unit heat pumps.

Unfortunately the Association of Home Appliance Manufacturers

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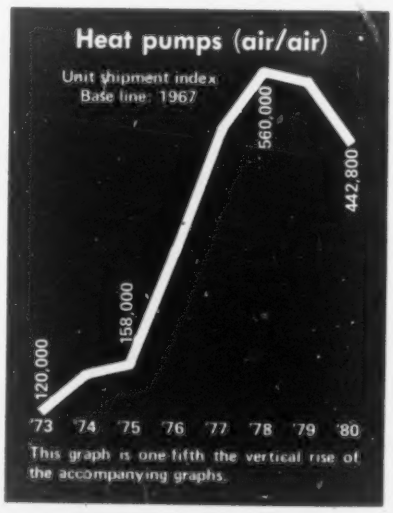


Air conditioning . . .

(Continued from Preceding Page)

(AHAM) does not break out room unit heat pumps from its room air conditioner statistics. The News believes the heat pump share to be in excess of 20%.

Not considered in last year's shipment figures, but sure to be a factor in the future, are air-to-water heat pumps used to heat domestic hot water. These units are just entering the marketplace.

Unitary heat pumps probably will hold even in 1981 at about 450,000 units. Small continuing losses to gas should be offset by small gains in the new home and replacement markets. These factors, together with the lean inventories, should help stabilize this market.

This second boom in heat pump applications (the first was in the late 1950's) will be sustained, we feel, because it is much more diversified than the first, equipment and installation skills are better, and equipment is finding its way into applications where natural gas availability is not a significant factor. Too, decontrol of natural gas and the already apparent escalating prices of this fuel will make heat pumps more and more competitive even in strong natural gas markets.

Continuing expansion of water-source units, the heat pump water heater, and the application of air-to-air heat pumps to new and existing gas- and oil-fired furnaces promise a growing heat pump market in the future. Add to this the fact that, but for almost-prohibitive interest rates, housing starts should be at the 2-million level to satisfy demand and the picture becomes even rosier.

Water-source units

For many years, water-source heat pumps occupied an interesting sidelight category of industry equipment that produced steady, if unspectacular, shipments of less than 40,000 units each year. The surge in these shipments reported in the previous two Statistical Panoramas, however, is only part of the story.

These units, not counted in the unitary total (which includes only air-to-air heat pumps), have been applied in the deep south for many years. Many are used on closed-loop systems, particularly in south Florida, and others use water from a well, the ocean, or a pond to produce comfort heating and cooling.

In 1978, water-source heat pumps recorded a 36% increase to 54,700 units and, in 1979, shot up another 28% to 70,000 units. Last year the increase was 19% to 84,000 units, more than twice the level of 1977 and prior years. Water-source heat pumps should pass the 100,000 shipment mark in 1981.

These units, however, are ARI-rated for water of 70°F and normally operate with water in the 60° to 90° range. Over the past few years another group of a half-dozen small manufacturers have developed similar units for cold water (to 45°) applications which, for the most part, are not yet counted with their warm-water cousins. They could total another 20,000 to 25,000 units and may be growing at an even faster rate.

The so-called northern water-source units have experienced remarkable growth in isolated northern markets where ample ground water is available. They are particularly attractive in rural and exurban areas beyond natural gas mains where the energy sources are high-cost electricity, fuel oil, or LP gas.

Water-source systems use well water, a water loop kept in balance

Census promises new categories for water-source heat pumps, RV's

Because of a lack of comparability between some categories of industry and Bureau of Census statistics, negotiations have produced two new categories — recreational vehicle air conditioners and water-source heat pumps — for the next Census Bureau report.

The 1980 Bureau of Census Current Industrial Report MA-35M is scheduled to be issued in December, 1981.

In a report to members of the Air-Conditioning and Refrigeration Institute (ARI), general manager B. A. Sienkiewicz said negotiations are continuing to break out screw-type liquid chillers from the reciprocating liquid chiller category — but not from large-tonnage liquid chillers.

Meanwhile, ARI also has asked the Census Bureau to check the room fancoil and ice-maker categories for possible double reporting by some companies. This happens sometimes when manufacturers use branded products (units built by others but sold by them) to fill out short lines.

The problem is complicated by the confidential nature of individual company shipment figures, which must be respected by those who gather the numbers or the system would collapse. For this reason, the Census Bureau can only ask these companies to check their reporting methods. It cannot oversee the operation.

In the case of room fancoils, for instance, Census reports 178,417 units were shipped in 1979. Figures compiled by The News, which relate to the ARI numbers, show 151,000 units. Similarly, the Census Bureau shows 201,283 ice-makers were shipped in 1979. The News shows 135,300.

ARI believes that most of the difference between the Census Bureau figure of 9,697 reciprocating water chillers shipped in 1979 and the ARI figure is accountable to liquid chillers equipped with small- to medium-sized screw compressors. The News estimated that 8,100 reciprocating chiller packages were shipped in 1979.

The big difference, however, came in the unitary category. ARI shipments for 1979 were listed as 2,680,597 units while the Census Bureau figure was 380,608 units higher, or 3,061,205 units. Part of the difference comes from the fact that the Census Bureau includes 113,000 export units and ARI does not.

Investigation by ARI showed that some of the remaining difference was contained in the subclassification of horizontal air conditioners of less than 27,000 Btu/h. ARI showed 18,500 and Census showed 187,465. Most of this difference is believed to be recreational vehicle air conditioners.

In a similar vein, ARI shows 547,694 air-to-air heat pumps (excluding room units) were shipped in 1979. The Census Bureau, which includes water-source units in its figures, shows a shipment figure of 646,926 units. This 99,232-unit difference is reduced substantially, however, if ARI adds its 71,000 water-source units plus shipments by manufacturers who do not report water-source unit figures to ARI.

Chances are good, then, that 1980 ARI and Census Bureau figures will be within 5% of each other.

by a small boiler and cooling tower, or ground water boosted by low-temperature solar or process heat. They have twin advantages over air-source units of having no defrost cycle to interfere with efficiency or reliability and they have a predictable worst-case heat output.

Despite their advantages, however, they are not inexpensive when the cost of providing the water source is considered, their application often relies on an alliance between well drillers and hvac contractors, and water disposal — especially in urban areas — can pose financial and code problems.

Heat pump water heaters

Heating domestic hot water, the second largest energy-related expense in most U.S. homes, has been handled for many years by electric and natural gas-fired water heaters with a small assist from special jackets on space-heating boilers. In recent years a comparatively few solar-assisted units have been added.

Those who use natural gas to heat domestic hot water probably will continue to do so for at least another five years. But a new method — an air-to-water heat pump — is breaking into the market to assist those who must rely on electricity, LP gas, and oil. It will cost more than twice as much as a conventional electric unit, but only a quarter as much as solar. Operating savings, however, are in the order of 40% or more.

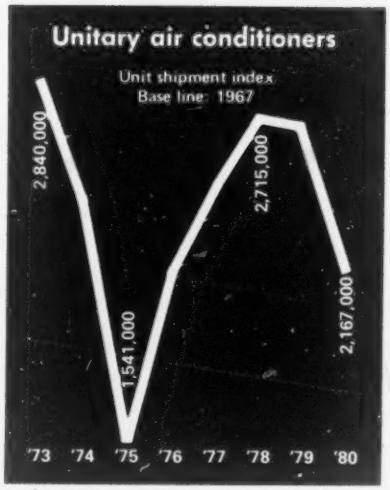
There are no statistics for these units, which have only entered the market in the U.S. and in Europe over the past 18 months. But they do have the potential to become a new mass market that will rival residential air conditioning in numbers and importance. Electric water heater shipments, for example, have been running at about 2.5 million units each year.

Rooftops

Indications are that commercial rooftop shipments in 1980 declined by 10% — or about half of the rate of all unitary air conditioners and heat pumps. The reason we say "indications" is that no official sources attempt to classify rooftops.

Commercial rooftops really represent a market application of several different products rather than a single product type that can be identified statistically.

For example, all-year units are identified by the Bureau of the Census and clearly imply a heating capability. However, both single-package and split-system rooftops, although they may have been shipped



(and counted) as cooling-only units, may have a modular heating section added in the field. Too, heat pumps imply one and, usually, two methods of heating as well as cooling. Another complicating factor is that small all-year rooftops are applied in more residential than commercial situations.

In an attempt at clarification, we have applied known ratios contained in the 1979 federal statistical reports (the latest year for which these figures are available) against the 1980 ARI unitary figures to provide a perspective of the rooftop market that, although somewhat inexact, still is a better and more accurate view than we have been able to present in the past.

First, we must remove heat pumps from both the ARI and Census Bureau figures. We also have removed 168,000 horizontal single-package units from the Census report in line with the ARI view that these are recreational vehicle units (see separate story in this section).

This exercise is made necessary because ARI publishes only totals for unitary air conditioners and heat pumps together with a combined equipment size breakdown while the Census Bureau, which attempts to break out some equipment types, also includes a few units not counted by ARI.

Applying the Census Bureau's ratios to ARI's 1980 unitary air conditioner (less heat pump) figure of 1,723,885 units, we find that:

- 78% — or 1,345,000 units — were split systems;
- 12% — or 207,000 units — were all-year packages; and
- 10% — or 172,000 units — were single-package air conditioning units.

Additionally, the 442,829 unitary heat pumps shipped in 1980 but not included in the foregoing breakdown included 70% — or about 310,000 — split systems and 30% — or 133,000 — single packages. About 2.5% — or 11,000 units — had cooling capacities in excess of five tons and could be considered rooftops.

Of the 207,000 all-year packages we estimate were shipped last year, we estimate that 55% of them went into residential applications. The remaining 45% — or 93,000 units — went into commercial applications. Of these, 33,000 had capacities in excess of five tons.

Similarly, The News estimates that 15% of the 1,345,000 split-system air conditioners — or 200,000 units — were commercial rooftops. Of these, 34,500 units had capacities of more than five tons. And of the 172,000 single-package air conditioners shipped last year, The News estimates that 55% were residential units and 45% — or 77,000 units — were commercial rooftops. Of these, 16,000 units had capacities in excess of five tons.

Taken together, the total commercial rooftop market last year is estimated at 381,000 units, of which 25% — or 94,500 units — had capacities in excess of five tons. Although it was reached by a different method, the total is in reasonable agreement with the ARI total of 99,472 unitary air conditioners of more than 5-ton capacity shipped in 1980.

Looking directly at the ARI capacity breakdown, there were 35,776 unitary air conditioners shipped last year with capacities of more than 11 tons and, of these, 11,960 had capacities of more than 20 tons. This is almost exactly the experience of the previous year and indicates that the 10% decline in the commercial segment of the market was entirely in the smaller (less than 11 tons) equipment sizes.

Mobile air conditioners

According to the Motor Vehicle Manufacturers Association, there were 5,076,222 factory air conditioner installations in U.S. domestic automobiles in 1980, down 17% from the 5,937,878 factory installations made in 1979.

Part of this drop is accounted for in the 6.6% drop in U.S. car production from 7,449,352 units in the 1979 model year to 6,957,191 units in the 1980 model year. Air conditioning penetration also slipped, however, from 79.7% in 1979 to 73% in the last model year.

The drop in air conditioning penetration was caused in large measure

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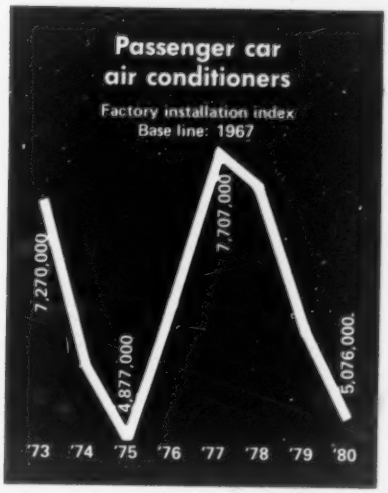
Air conditioning . . .



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by the higher percentage of high-mileage 4-cylinder compacts and subcompacts sold last year. At the same time, sales of standard-sized and luxury cars were down.

But even the compacts and subcompacts took advantage of the lighter and smaller-capacity cooling units being made for these cars. Penetration of air conditioning ranged from 35% to 50% for most models. Factory air was installed in 36% of Volkswagen Rabbits built in the U.S., for instance.

The automobile statistics do not include the 673,000 factory air conditioners installed in domestic light trucks — a 40.6% penetration rate — nor do they include the 620,000 imported cars (or 40.6%) or 67,000 imported light trucks (14% of the total) that were equipped with factory air.

Statistics used by Ford in an advertising campaign would have us believe that nine out of ten new car buyers retain their preference for air conditioning when they purchase a smaller car.

Aftermarket shipments of auto air conditioners have been grossly overestimated in the past, according to the International Mobile Air Conditioning Association. It estimates that in its peak year, 1978, shipments totaled about 1 million units.

In 1979 aftermarket shipments dropped 10% to 900,000 units and, in 1980, shipments dropped another 16.6% to 750,000 units. IMACA expects a small recovery in 1981, perhaps half-way back to 1979 levels, or 825,000 units.

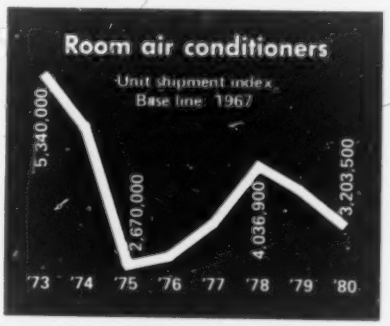
The auto air conditioning aftermarket depends on imported cars for almost two-thirds of its sales. The future is clouded by uncertain domestic auto production levels, moves toward voluntary U.S. market cutbacks by Japanese manufacturers, and by a depressed domestic light truck and recreational vehicle market.

The association also is concerned about a growing practice among foreign car manufacturers of shipping uninstalled air conditioners in the trunks of cars they are intended for. The air conditioners are installed by dealers and the government-mandated mileage figures escape the penalty the extra load air conditioning would impose on the engine.

Although 1980 figures are not available, the Bureau of the Census reported that 1,298,198 mobile air conditioners were shipped in 1979 for truck, agricultural, and off-highway construction vehicles. This represents a decrease of 43% from the 2,292,676 mobile units shipped in 1978.

These figures do not include the thousands of mobile air conditioners destined for recreational vehicle and pleasure boat applications. The Census Bureau lumps them into the unitary air conditioning category. The Air-Conditioning and Refrigeration Institute (see related story in this section) estimates this number at 168,000 in 1979. However, the 1980 Census Bureau report, which will be issued in December, will have a separate category for this classification.

At the same time, the Census Bureau showed 7,651,618 auto air conditioning systems were shipped in 1979, down 15.7% from the 9,074,932 units shipped the previous year.



Room air conditioners

Room air conditioner shipments dropped to 3,203,500 in 1980, down 10.8% from the 3,748,700 units shipped in the previous year. It marks the second down year in a row. Both figures are, however, far above the 2.67 million units shipped in 1975, but are considerably below the 5 million-plus years of the early 1970's.

Because of the abnormally hot weather throughout most of the country last summer, inventories are probably abnormally low in most areas. But like related central air conditioning equipment, prohibitive interest costs are also probably preventing the refilling of the supply pipeline at anything like normal rates.

Not to be forgotten, too, is the fact that the 805,869 room units exported last year amounted to 25% of the 3.2-million total shipments. Exports of 810,257 units in 1979 amounted to 21.6% of total shipments. (See the International section for a listing of key export markets).

Contrary to the expectations of some, high energy costs have not caused consumers in significant numbers to switch from central to selective cooling of homes. Room units remain essentially an impulse purchase influenced more by the weather than any other single factor.

Although the economy continues unsettled, consumer purchases have remained stable for more than six months. Even with a normal amount of hot weather this summer, abnormally low inventories are likely to trigger at least a 10% increase in room units shipments — to 3.5 million units — in 1981. Sluggish economics abroad are likely to prevent shipments from going higher.

Chillers

After several years in the doldrums, chiller shipments showed a sharp 24% increase in 1980 to 14,530 units. The previous year's figure was 11,730 units, about the

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Sell the Gas Advantage:

Energy Savings Payback.

Most of your customers have probably already heard about the advantages of gas. If not, tell them the facts:

That gas is America's most efficient energy system. New gas heating systems and water heaters with energy-saving features make gas even more efficient. They save the buyer money in operating costs all the years the equipment is used. That savings is called Energy Savings Payback (ESP).

The ESP on a new efficient gas furnace can save up to $1,500* over a 17-year period, compared to a conventional gas furnace. The ESP on a new gas water heater can be $400* over a 10-year period. Savings for both would be even greater compared to other, more expensive energy systems.

Sell the gas advantage. Your customers will save energy and money. You'll sell more top-of-the-line gas equipment. And you'll both come out ahead.

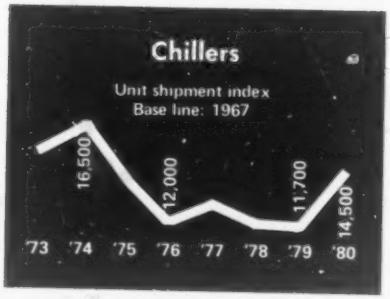
*Government testing procedures were used to determine all annual operating costs.

You'll both profit.

Gas: The future belongs to the efficient.

AMERICAN GAS ASSOCIATION © 1981

Air conditioning . . .



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same as for 1978.

The 4,600 centrifugal chillers shipped last year, a 37% increase over 1979's performance, accounted for much of the surge. The domestic and export markets contributed almost equally.

In 1980 there were also 9,650 reciprocating chiller packages shipped, an increase of 19% over the 8,100 reciprocating chillers shipped in 1979. Shipments of absorption chillers held constant in 1980 at 280 units.

The outlook is for a slightly improved chiller market in 1981. Although bookings for reciprocating chiller packages in December, 1980, were about the same as a year earlier, bookings for centrifugals were up 38%. Absorption chillers should hold even at the present depressed level. (The absorption chiller figures refer to "big system" chillers only and do not include the 2- through 25-ton gas- and solar-fired packages.)

It might be noted, too, that there are no separate categories for screw, rotary, and other compressor types in either ARI or federal statistics. ARI has asked the Bureau of the Census to set up a separate category for screw-type liquid chillers.

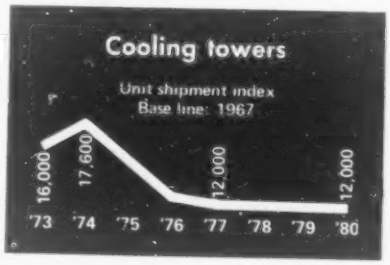
A breakdown by chiller type follows:

Year	Recip.	Cent.	Abs.
1970	10,300	4,150	1,000
1971	10,000	4,000	900
1972	10,000	3,000	900
1973	10,400	4,100	800
1974	11,000	4,500	1,000
1975	8,250	4,950	700
1976	7,600	3,400	500
1977	8,900	3,000	450
1978	8,100	3,350	370
1979	8,100	3,350	280
1980	9,650	4,600	280

Cooling towers

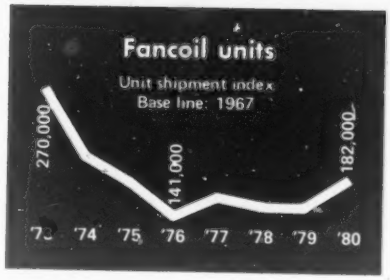
Although The News has no way of checking for sure, it believes that shipments of factory-assembled cooling towers have continued on a four-year plateau within 10% of 12,000 units. The last federal statistics showed 12,168 units were shipped in 1977. There was no report in 1978 or 1979 because publication would have meant disclosing the operations of individual companies.

The Bureau of the Census reported that 1979 shipments of evaporative condensers amounted to 2,517 units, up 2.6% from a 1978 shipment figure of 2,453. Shipments were divided almost equally between units with capacities of less than and more than 100 tons.



Fancoil units

Shipments of fancoil units in 1980 amounted to 182,000 units, up 20.5% from the revised figure of 151,000 units for the previous year. Bookings indicate that this product, which tends to follow chiller shipments by about half a year, should increase by more than 10% in 1981.



Gas air conditioners

Shipments of gas air conditioners, which became increasingly popular in many areas during the 1960's until natural gas curtailments restricted their market, increased in 1980 by 1.25%, or 200 units, from a revised previous-year figure of 16,000 units.

Water-fired absorption air conditioners used in conjunction with solar-assisted comfort cooling systems, including the 25-ton packages, are included in last year's 16,200-unit figure. Exports also are included.

Arkla Industries Inc., the sole domestic producer of this gas- and solar-fired equipment, also are developing a gas-fired heat pump — a product gas utilities have been clamoring for ever since electric heat pumps surged in 1975.

Refrigeration

Unit shipments of commercial refrigeration equipment dropped by 9.3% in 1980 when compared with the previous year's levels, according to the Commercial Refrigerator Manufacturers Association (CRMA).

Dollar value of this equipment increased by 3% over 1979 levels, however, the association reported.

Overall standard-temperature cases were down 10.7% and reach-ins were down 9.4%. Standard-temperature walk-ins were down 10.9% and other standard-temperature equipment was down 66%.

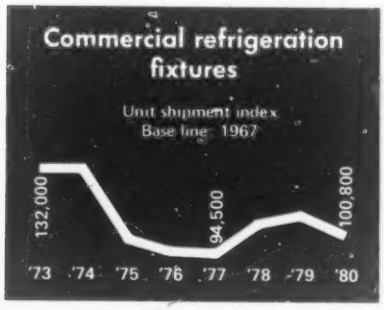
Low-temperature shipments were down 7.8%, CRMA reported. Single-deck units dropped only 1.2% but low-temperature multidecks dropped 34.9%. Enclosed freezer cases were down only 2.1%.

Refrigerators

Domestic refrigerator shipments totaled 4,828,400 last year, down 10% from the revised figure of

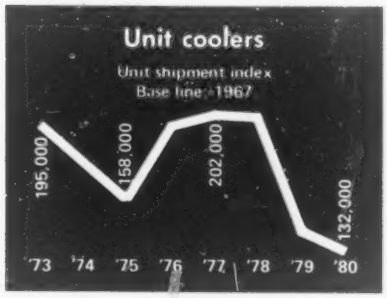
5,364,500 in 1979, according to the Association of Home Appliance Manufacturers. The industry is expecting to hold even in 1981 and, possibly, increase shipments by a few percentage points.

Shipments of home freezers in 1980 amounted to 1,592,500, down 9.3% from the revised figure of 1,757,600 units shipped in 1979. The 1980 breakdown shows 44% were upright models and 56% were chest-type home freezers. The outlook for 1981 is for a 3.5% increase to 1,650,000 units.



Unit coolers

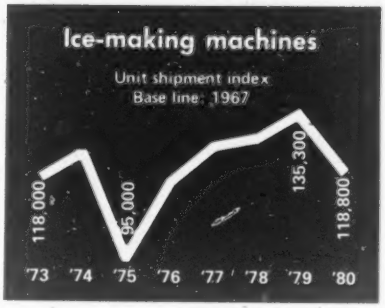
Shipments of unit coolers in 1980 declined 7% to 132,000 units when compared with a revised 1979 figure of 142,000 units. These figures include about 5,000 units in each year which were shipped abroad.



Ice makers

Shipments of ice-making equipment declined by 12% in 1980 to 118,800 units. This compares with a figure of 135,300 units shipped in the previous year. Of the 118,800 units shipped last year, approximately 74% were cubers, 19% were flakers, and 7% were combination ice maker-dispensers.

The Bureau of Census report shows 201,283 ice-making machines were shipped in 1979, the latest year for which figures are available. This is a 3.7% increase over the 194,049 figure shown in the Census



report for 1978 — and 48.7% higher than The News figures for 1979 ice maker shipments.

The government figures, The News believes, includes production figures for manufacturers who do not participate in industry statistics programs. Too, ARI has asked the Census Bureau to check possible double reporting.

Refrigerated warehouses

Although the public refrigerated warehouse industry didn't quite eclipse the records set the previous year, 1980 was a good year, according to data released by the International Association of Refrigerated Warehouses (IARW).

The group reported that product in public freezers totaled more than 4.45 billion pounds in October, within 1% of the all-time record set in 1979. It represents 65% of all frozen products in public and private storage — a total of 6.893 billion pounds.

IARW reported that public freezer occupancy averaged 75% during 1980's peak season, down a bit from the 77% average the previous year, but still ample evidence that the industry has adequate capacity to meet the needs of the frozen food industry during peak storage seasons.

During the past year IARW members have added 50 million ft³ of freezer space. This brings the total amount of public freezer space up to 796 million ft³ from a revised 1979 figure of 746 million ft³.

To illustrate its growth, IARW reported that in 1949, the industry capacity was just under 134 million ft³ of freezer space.

Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and the earlier published data. Where sources give significantly varying information, that data is mentioned.

Food stores

The Food Marketing Institute provides a considerable amount of data on the nation's 34,000 supermarkets.

Of these, about 5% are closed each year, with the north central states having the most closings and the fewest in the west. The number of new store openings, with the south the leader, usually equals the number of closings. Store acquisitions, with an accompanying average $62,000 renovation expenditure averages 3%.

Major remodels of $50,000 or more were done on 6.4% of the store inventory in 1979, the latest year for which figures are available. The average cost of structural changes amounted to $250,000 and the average cost of new fixtures and equipment was $340,000 for each remodel job.

Energy consumption has been a major concern of supermarket operators since the late 1960's. FMI reports that the percentage of new stores which reclaim heat from the refrigeration equipment rose from 59% in 1975 to 96% in 1979. Of these, 73% reclaim heat for both space and domestic hot water heating.

Additionally, 80% of new stores use double doors at the main entrance, 58% have enclosed loading docks, and 41% use lowered ceiling heights. A total of 26% of supermarket operators use electronic energy management controls, most of them controlled at the store. The average R value for roof insulation is 13.7 and for exterior sidewalls it is 9.3.

During remodelling, more than 60% changed to more efficient refrigeration systems, 54% installed more efficient space heating and cooling systems, 50% added electronic energy controls, and 36% lowered lighting levels.

Because freezers use 25% to 30% of total store energy, the footage of cases with glass doors increased from 29% in 1978 to 38% in 1979. Similarly, open or coffin cases were used in only 70% of new stores opened in 1979 and the proportion of stores using multideck cases dropped from 49% in 1978 to 44% in 1979. The average linear footage for freezers remained the same at 198 feet.

Heating
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Heating

Gas-, oil-, and solid fuel-fired boiler unit shipments increased by 11.5% in 1980 to 372,974 units, according to The Hydronics Institute. This compares with a unit shipment figure of 334,454 boilers in 1979.

Shipments of cast iron boilers were up 19% to 347,946 units last year compared with a 1979 figure of 291,984. Steel boiler shipments dropped by 41%, however, to 25,028 units in 1980 compared with 42,470 units the previous year. Steel boiler shipments had dropped by nearly 12% in 1979.

The gas share of the cast iron boiler market continued its steep upward climb as a result of natural gas availability and the rapidly escalating price of fuel oil, the other major boiler fuel. Gas captured 85% of the cast iron boiler market last year compared with 76% the previous year and 50% in 1977.

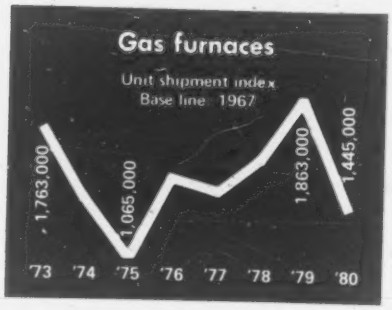
Oil's share of the cast iron boiler market in 1980 was 15%. This compares with 24% in 1979, 43% in 1978, and 49.5% in 1977. Boilers fired by solid fuels (coal, wood, waste) dropped slightly to 0.025% last year from 0.046% in 1979.

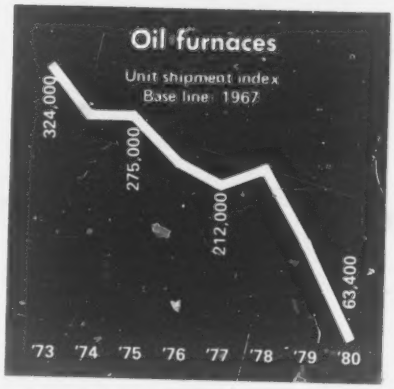
The share of cast iron hot water boilers dipped slightly from 77.6% in 1979 to 75.3% last year while cast iron steam boilers experienced a corresponding increase from 22.4% in 1979 to 24.7% last year.

Radiation shipments in 1980, according to HI, are: convectors 2,171,878 ft² EDR (equivalent direct radiation), up 5.3% from the 1979 figure of 2,062,255 ft² EDR; baseboard 31,029,785 ft² EDR, down 35% from the 1979 figure of 47,715,293 ft² EDR; and commercial finned tube 8,768,417 ft² EDR, up 9.4% from the 1978 figure of 8,014,475 ft² EDR.

Total radiation, at 41,970,000 ft² EDR, was down 27.3% from the 1979 figure of 57,792,023 ft² EDR.

The sharp drop in baseboard radiation shipments is due in part to the continuing low number of housing starts in the northeast and midwest. Most of the drop, however, stems from the large number of oil-to-gas conversions in which baseboard radiation already was in place.





After a 31% slide in the previous year, **oil furnace shipments** in 1980 dropped again by 59.8% to 63,400 units, according to the Gas Appliance Manufacturers Association (GAMA). Shipments in 1979 amounted to 157,800 units.

In October, 1980, GAMA forecast that oil-fired furnace shipments will drop by 11% this year to 56,400. We feel the forecast is too conservative by a factor of two because of oil's shrinking (now 3%) share of the new home market and its continuing high cost in comparison to natural gas.

GAMA added, however, that oil furnace shipment figures have not been expanded to include the total industry. The Bureau of the Census reported shipments of 169,577 residential oil furnaces and 10,690 commercial units (of more than 150,000 Btu/h) for a total of 180,267 units in 1979, the latest year for which figures are available.

Fuel Oil/Oil Heat magazine estimated the 1979 market for oil furnaces at 180,000. The magazine estimated that shipments dropped to 82,000 in 1980 — a 54.4% drop.

Gas furnace unit shipments, reflecting the sharp drop in housing starts, showed a 22.4% drop in 1980 to 1,445,100 units. The 1979 figure was 1,862,600.

GAMA expects gas furnace shipments to increase by 12% this year to 1,618,700 units. Despite a continuing high rate of conversions, particularly from oil, and an expected slight upturn in housing starts, The News feels gas furnace shipments will hold even in 1981.

Conversion burner supplies have loosened up considerably in recent months, a reflection of more manufacturing capability and a slackening in the rate of increasing demand.

Earlier, AGA estimated that it made 382,000 conversions from other fuels last year, most of them from oil. Most were made in the north central states (140,800), mid-Atlantic (97,300), and south Atlantic (82,800) states.

Additionally:

Gas-fired unit heater shipments dropped in 1980 by 5.1% to 176,720 units from a revised figure of 186,180 units shipped the previous year. Expect a drop of at least that amount in 1981.

Gas-fired duct furnace shipments increased by 13% in 1980 — from 18,430 units in 1979 to 20,830 units last year. Shipments should hold even in 1981.

Gas-fired wall furnace shipments dropped 3.5% in 1980 from the revised figure of 207,000 in 1979 to 199,820 last year. Gas-fired floor furnace shipments in 1980 amounted to 12,240 units, a drop of 21.3% from the 15,560 units shipped in 1979.

Among the complications of marketing residential gas furnaces and boilers are new U.S. Department of Energy test methods and Federal Trade Commission-mandated fact sheets listing relative efficiencies in particular size ranges. State laws requiring such things as flue dampers and, more commonly, electronic ignition are made even more troublesome by the fact that some states have changed their minds and others do not enforce the rules. Federal minimum efficiencies now are on hold until the new Reagan administration can figure which way to go.

Electric furnaces continued to face the triple onslaught of renewed natural gas availability, heat pumps, and a declining housing market. Shipments of electric furnaces dropped 19.7% last year, from 283,200 units in 1979 to 227,200 units in 1980. We feel shipments in 1981 will continue to slip by 5% to 10%.

Just at a time when we thought the market for gas, oil, and electric

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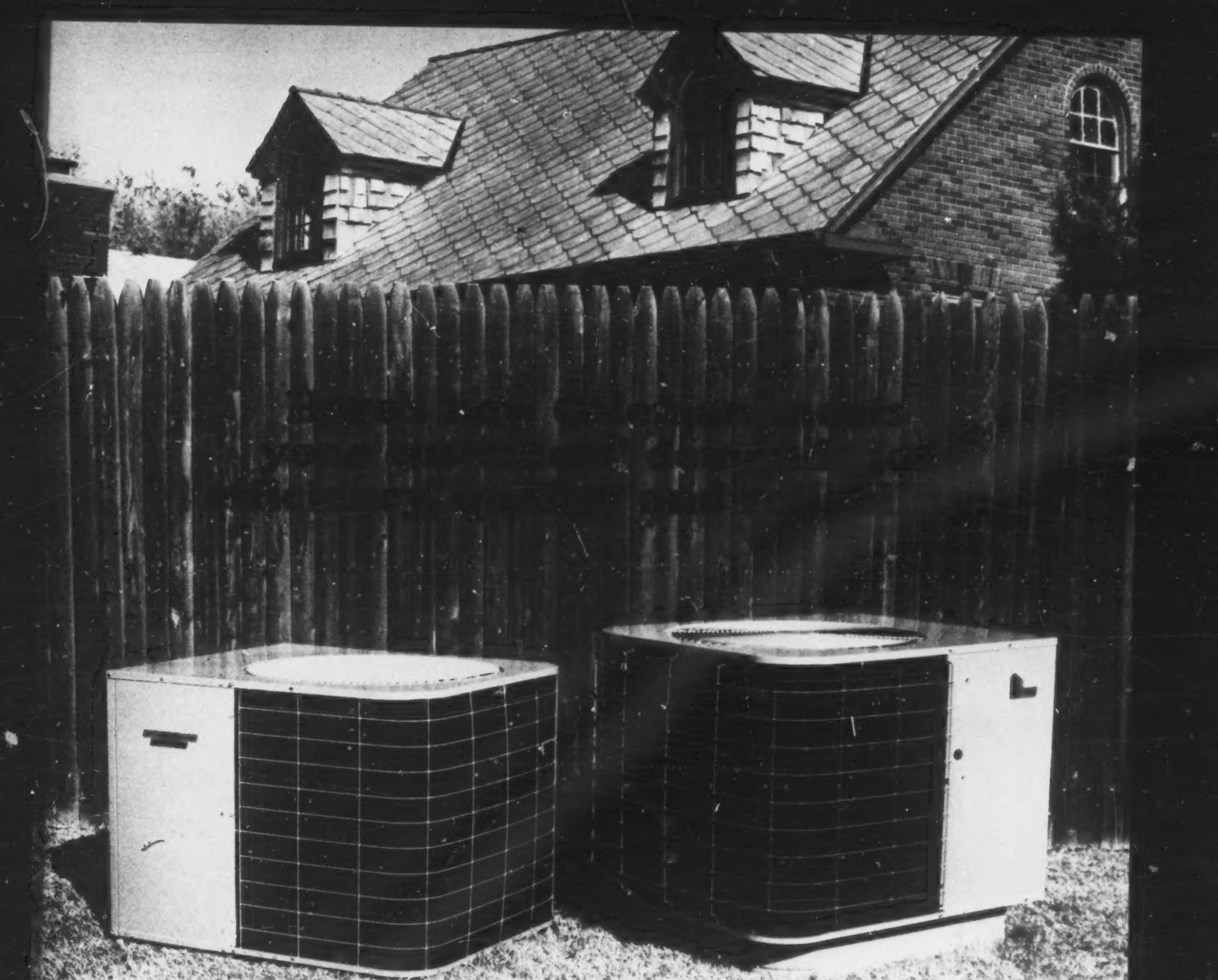

Coleman Deluxe Energy Saver™

Surveys indicate efficiency, quality and reliability are the three main concerns of today's consumer. And when it comes to energy-efficient air conditioners, our Deluxe Energy Saver (D.E.S.®) gives Coleman dealers a big edge over the vast majority of the competition.

Couple this energy efficiency with the quality and dollar-for-dollar value of the D.E.S., and it's easy to see why Coleman's dealer organization is cashing in on an ever-growing share of the replacement air conditioner market.

T.H.E.™ Heat Pump by Coleman

In *total comfort* systems, you can't do better than feature T.H.E.™ Heat Pump by Coleman. Boasting one of the industry's top energy efficiency ratings — in both its heating and cooling modes — T.H.E.™ Heat Pump is as big on quality as the D.E.S. and every bit as big a bargain using payback and performance as economic yardsticks.

If you're looking for products with built-in sales appeal, products that dovetail with the demands of today's consumer, let's get together. Call for the name of your nearest distributor *now*.

The Coleman Company, Inc., Residential Products Division
Wichita, Kansas 67201
Phone: 316-832-6486

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HEATING & AIR CONDITIONING

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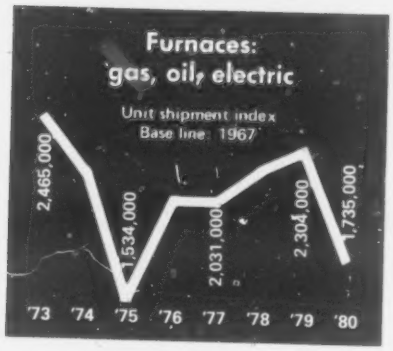
Heating--



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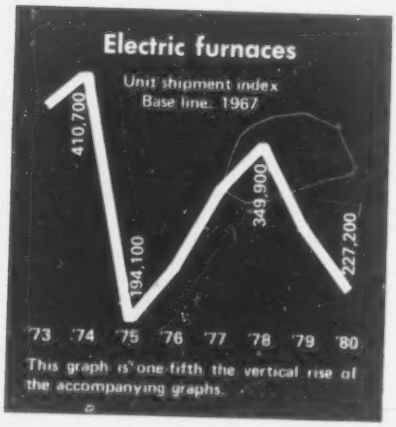
furnaces was departing from its traditional shadowing of the single-family housing market because of a growing replacement market, the market returned to its old form.

In 1980 total **gas, oil, and electric** furnace shipments amounted to 1,735,700 units — down 24.7% from the 2,303,600 units shipped in 1979. Housing starts in 1980 also dropped by an almost identical percentage. Unfortunately, The News has no way of checking to determine how inventory shifts affected the outcome.

Oil burner installations in 1980 totaled 585,000 units, a decrease of 19% when compared with the revised figure of 735,000 in 1979, according to Fuel Oil/Oil Heat and Solar Systems magazine.

Of these, 30,300 oil-fired systems were installed in new single-family homes last year, down a whopping 64% from the 85,000 oil-fired systems installed in new homes in 1979. Part of the reason was that oil heating's stronghold, the northeast, had a less than 10% share of new home completions last year.

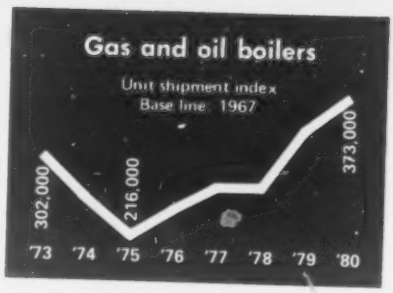


The escalating cost of fuel oil ($1.25/gal in March) was another major reason.

There were 540,000 replacement oil burners shipped in 1980, an increase of 10.8% over the 487,000 replacement burners shipped in the previous year. The magazine estimates that, included in the 1980 total, were 432,000 retention-head and other high-efficiency burners which replaced less efficient burners on both a voluntary (to reduce heating costs) and involuntary (breakdown) basis.

Conversions to oil from other fuels, at about 10,000 in 1980, dropped 16.7% from the 1979 level of 12,000. Losses by oil to other fuels were not estimated. (The American Gas Association (AGA) estimated however, that there were 383,000 conversions from other fuels to gas in 1980, 95% to 97% of them from oil.)

It was estimated there were 71,000 oil-fired boilers shipped in 1980, down 35.5% from the 110,000 units shipped the previous year; and there were 82,000 oil-fired furnaces



shipped last year, down 54% from the 180,000 units shipped in 1979. Oil-fired furnaces and boilers accounted for 425,000 units in 1978.

Shipments of **commercial-industrial heating boilers** from 10 boiler hp to 1,000 boiler hp declined by 12% in 1980 to 7,650 units, according to the American Boiler Manufacturers Association (ABMA). The 1980 figure compares with shipments of 8,700 units in 1979.

The decline was shared almost equally by packaged firetube (from 3,400 units to 2,950 units last year) and commercial boilers (from 5,300

Estimated 1980 cast iron boiler shipments by thermal capacity

Gross output, Btu	Steam	Water	Total
Less than 50,000	27	5,300	5,327
50,000 to 74,999	1,267	28,811	30,078
75,000 to 99,999	9,993	50,101	60,094
100,000 to 124,999	23,661	75,917	99,578
125,000 to 149,999	13,934	40,577	54,511
150,000 to 199,999	14,438	33,422	47,860
200,000 to 249,999	8,537	12,768	21,305
250,000 to 449,999	7,847	11,365	19,212
450,000 to 949,999	3,129	2,169	5,298
950,000 to 1,549,999	1,565	965	2,490
1,550,000 and over	1,437	756	2,193
Total	85,835	262,111	347,946

Estimated 1980 cast iron boiler shipments by fuel

Gross output, Btu	Solid fuel	Gas fired	Oil fired	Total
Less than 50,000	0	5,306	21	5,327
50,000 to 74,999	55	29,648	375	30,078
75,000 to 99,999	116	57,787	2,191	60,094
100,000 to 124,999	187	86,391	13,000	99,578
125,000 to 149,999	45	41,368	13,098	54,511
150,000 to 199,999	280	36,509	11,071	47,860
200,000 to 249,999	82	17,217	4,006	21,305
250,000 to 449,999	41	15,467	3,704	19,212
450,000 to 949,999	29	3,359	1,910	5,298
950,000 to 1,549,999	19	1,471	1,000	2,490
1,550,000 and over	41	717	1,435	2,193
Total	895	295,240	51,811	347,946

units in 1979 to 4,700 units last year).

ABMA feels shipments of commercial boilers will hold even in 1981 and that shipments of firetube boilers will gain just a bit to 3,050 units. Total capacity, however, will increase by a larger margin.

The market has been relatively static for three years, due in part to energy conservation measures in industrial plants and in part because of continuing uncertainty over federal conservation and environmental regulations which often inflict opposite demands on boiler users.

A complicating factor in 1980 was the weakening of the general economy. Because large industrial users were experiencing a slowdown, this factor last year also was felt by the smaller industrial plants and the commercial sector.

Shipments of burners of 400,000 Btu/h to 25 million Btu/h increased sharply by 52.6% in 1980 to 29,000 units, according to ABMA. The 1979 figure was 19,000 units. Most of the increase came in the gas burner and combination (natural gas-oil and natural gas-LP) burner categories. Shipments are expected to decline only slightly in 1981 to 28,000 units.

Related products

Pollution control

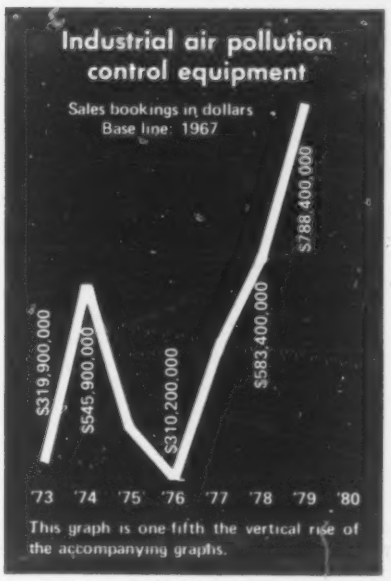
Sales bookings for industrial air pollution control equipment increased by 35% in 1979, the most recent year reported by the Industrial Gas Cleaning Institute, (IGCI).

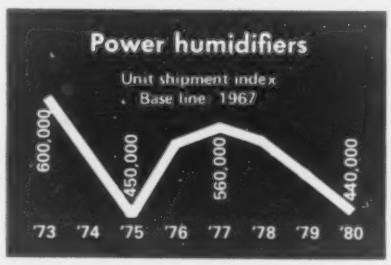
Total sales in 1979 amounted to $788.4 million, compared with $583.4 million the previous year. The total represents 41 reporting companies, two less than the number reporting 1978 data.

Shipment value of electrostatic precipitators, at $160.6 million in 1979, was down 22% from the $206.9 million worth shipped in 1978. The value of fabric filters, at $166.9 million in 1979, was up 5% from the previous year's total of $158.8 million. Flue gas desulfurization equipment shipments valued at $404.5 million in 1979 were up dramatically (154%) over the 1978 shipment value of $159.2 million.

The value of gaseous controls shipments, at $6.8 million in 1979, were up 54% over the $4.4 million recorded in 1978 and mechanical collector shipment values, at $19 million, were even. The value of wet scrubber shipments, at $29.3 million in 1979, was down 16% from the $35 million figure of the previous year.

The IGCI statistics cover new orders for installation in the U.S. and Canada. All figures include bare flange-to-flange hardware with the exception of flue-gas desulfurization equipment, which includes the total contract value.





Power humidifiers

The power humidifier market, like many others, has become a victim of inflationary restrictions on disposable income and the drop in housing starts. We estimate that shipments of power humidifiers have dropped 9.5% from 486,000 units in 1979 to 440,000 units last year.

This product, although primarily an add-on item, often is installed soon after a new home is sold — presumably by homeowners used to humidification in their former home. This may explain reports by manufacturers that shipments to the hvac industry held up well in 1980 but that shipments to mass merchandisers fell off sharply.

There was a suggestion, too, that a marked shift by department stores toward more self-serve and less personal selling already is showing a reduced ability to move home comfort equipment and accessories.

Fans

Overall shipments to members of the Air Movement and Control Association (AMCA) were up slightly last year over 1979 levels.

Centrifugal fan shipments in 1980 totaled $133,832,000, an increase of 9% over the year-previous figure of $132,643,744.

Industrial axial and propeller fan shipments amounted to $59,462,000 in 1980, down 1.3% from the 1979 figure of $60,251,544.

The value of power roof ventilator shipments last year was $58,706,000, an increase of 2.6% over the 1979 figure of $57,175,068.

Shipment values for louvers, dampers, and shutters increased by 6.7% last year, from $41,542,540 in 1979 to $44,353,000 in 1980.

AMCA in 1978 eliminated fans shipped to the power generation industry and placed them in another category which it does not make public.

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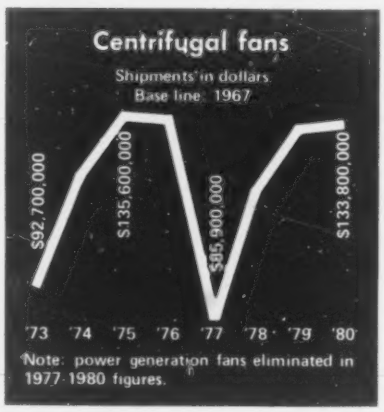


Related products--

(Continued from Preceding Page)

Central air handlers

Shipments of central station air handlers increased by 12% in 1980 to 65,000 units. This compares with 58,000 units shipped in the previous year. Look for a slight decline in this year's shipment figures.

Electronic air cleaners

Total shipments of electronic air cleaners dropped by 15.8% last year to 160,000 units. This compares with a revised 1979 shipment figure of 190,000 units.

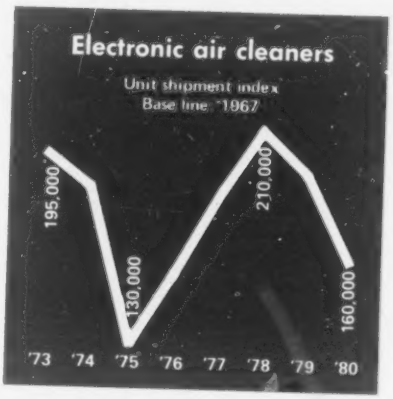
The outlook is not too bright for 1981 shipments of this product. Inflationary impacts on disposable income and a sluggish housing market should hold 1981 shipments at about last year's level.

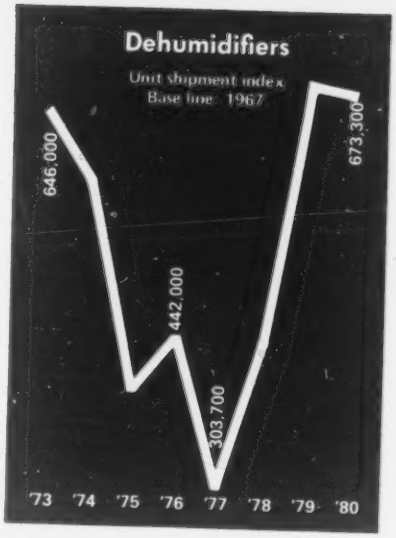
Although figures are not available, there is reason to believe that commercial electronic air cleaner sales are continuing to remain strong, primarily because of the trend in bars and bowling alleys to clean up recirculated air rather than bring in a lot of outside air.

Another major energy-related use for eac's is in homes equipped with heat pumps. They are used to keep the indoor heat exchanger free of dust in winter when the coils are dry.

Dehumidifiers

Shipments of dehumidifiers, which increased by 40% in 1978 and by 55% in 1979, dropped by a hair in 1980, according to the Association of Home Appliance Manufacturers (AHAM).





Manufacturer shipments of 673,300 units in 1980 were 1.2% below the revised figure of 684,700 units in the previous year. AHAM had predicted a 12% decline.

It might be noted that, in its latest report, the Bureau of the Census reports that dehumidifier shipments in 1979 amounted to 709,363 units, up from 477,692 units in 1978.

Induction units

Figures for induction units, now manufactured by only two companies, are no longer being tracked by The News or by the federal statistical program. The 1977 shipment figure was 20,000 units.

Comfort in construction

If we accept the theory that the nation will progress in three stages along the road of providing true comfort at home and at work with the greatest efficiency possible in a mass market, we must also accept the fact that most of the country has progressed beyond the first stage.

Each of these stages, we feel, will impact strongly on the industries served by this newspaper. That will include distributors and contractors as well as manufacturers. Each will involve marketing philosophy changes.

The first stage was largely one of awareness on the part of the public and the government that there exists, in the realm of present-day equipment and systems, more efficient methods of heating and cooling a space than with the lowest-cost system.

Two and threefold increases in fuel prices — even for those in the northwest and within the Tennessee Valley Authority region who may have thought they were insulated — and the often rash actions of federal and state governments have helped make the country aware of options most never knew existed. Stiff increases in the price of gasoline also helped.

That was the first stage. The second stage involves departures from traditional equipment which are based both on new technology and on a growing consumer willingness to pay more for higher efficiency. It had its beginnings in 1979 and, probably, will last another two or three years. Like the first phase, its course will be uneven and will be driven by the twin motivators of climate severity and fuel prices.

The third stage, as we see it, will begin about 1983 and will last into the foreseeable future. It will be a time when the education of both the public and government will be largely complete so that the job of providing substantially more efficient comfort heating and cooling systems for both new and existing homes and businesses can go forward hand in hand.

Examples

As an example, take the evolution of the gas fired furnace, the most common heating appliance for both new and existing homes. For nearly two generations it was largely ignored because it was inexpensive for builders to install and it was inherently reliable. In fact, the pilot was

usually left burning all year and, nationally, the filter was lucky to get a change once a year.

But, even for natural gas, the era of cheap energy has gone. Residential gas which cost $1.19 per million Btu in 1972 escalated to $4.36 per million Btu in 1980. Utilities began asking customers to turn off pilots under furnaces in summer and urged them to use spark ignition on new installations. Some states banned standing pilots on new furnaces and other gas-burning appliances. Flue dampers came into the marketplace and are being applied in large numbers.

New technology also entered. A recuperative furnace and a pulse combustion boiler were introduced with substantially higher steady-state and seasonal efficiencies. A pulse combustion furnace is scheduled to be introduced later this year. Most standard atmospheric furnaces are offered with spark ignition and flue dampers either as standard equipment or as an option. Heat pumps are offered that can use gas-fired backup so that, depending on outdoor temperature, the homeowner can operate on the most economical — and efficient — fuel.

All of these new options, however, cost more to buy and to install than the standard atmospheric furnace with standing pilot. And, unlike their lonely but reliable cousin, the new designs will require more maintenance. Standing pilots usually were good for the 20- to 25-year life of the furnace but the life expectancy of a spark ignition system probably is a quarter of that.

Much the same story is true for central air conditioning. To hold the line on price, particularly in the highly competitive speculative builder market, condenser surfaces got smaller and condenser fan speeds went higher. Those units did the job, however, and brought comfort to millions who otherwise might not have been able to afford it. The EER's (energy efficiency ratios) of 5 and 6 didn't matter too much when electricity was cheap.

But as electricity rates increased from an average of 2.54 cents/kWh in 1973 to 5.61 cents/kWh in 1980 — and to 12 cents/kWh in parts of the northeast — efficiency did become a factor. It became even more important in the south, where seasonal cooling costs were rivaling the seasonal heating costs in the north.

First the industry began promoting high-efficiency units with larger condenser coil surfaces and multiple-speed condenser fans, moves that also made outdoor units much quieter. Then came 2-speed compressors. Heat pump cooling efficiencies were improved sharply. Twin compressors and, ultimately, inverter drives were offered.

Despite the extra cost, the public responded. In 1978, a total of 36.9% of all units shipped had EER's of 7.5 or more. A year later that share had moved to 44.3%. When the figures showing last year's experience are complete, the share almost surely will top 50%. Meanwhile, water-source and solar-assisted heat pumps also were developed.

And although it has taken government officials a long time to realize it, the highest efficiencies do not now — nor will they ever — always make the most sense economically. Areas of the country with minimal heating or cooling loads may elect to optimize on that aspect that represents the most operating cost dollars — and the most energy — and save in first cost on the aspect that costs the least to operate.

Housing characteristics

Again this year, Statistical Panorama has added other dimensions which allow us — and the industry — to get closer to what's happening in today's home comfort market. Normally the characteris-

(Page 104, Please)

"GE'S NEW IN-HOME MINI
HAS ACTUALLY HELPED DOUB

-COMPUTER TERMINAL LE MY HEAT PUMP VOLUME."

Al Boerger
Recker & Boerger, Cincinnati, Ohio

"NOW, THAT'S WHAT I CALL A BORN SALESMAN."

"This terminal starts impressing my customers from the moment I take it into their homes.

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GENERAL ELECTRIC

1981 General Electric

Singer Announces the year 2001 Gas Furnace Warranty

Now, only Singer warrants every gas furnace into the 21st century.

Imagine a 20 year warranty on the heat exchanger of every Singer gas furnace model — from the least to the most expensive. Every Upflow, Counterflow and Lowboy.

No other manufacturer has a standard warranty like it. But then no other manufacturer has Singer's 30 year record of reliability, either. Reliability built on a hefty 18 gauge heat exchanger, instead of 20 gauge.

Singer gas furnaces have the fuel-saving features, too. Like a spark ignition that's proven itself in 15 years of tough service. And an automatic vent damper that's proven both fuel efficient and trouble free.

Not that we take anything for granted. We still test run every last Singer furnace before it leaves the factory.

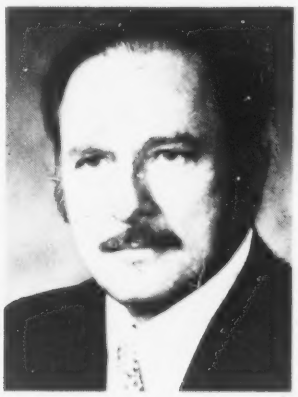
What it comes down to is this: We can warranty Singer gas furnaces for the next 20 years because they're proven to be steady, reliable performers for the last 30.

For more information on the new 20 year warranty (non-pro-rated), write The Singer Company, 1300 Federal Boulevard, Carteret, NJ 07008.

SINGER
CLIMATE CONTROL PRODUCTS

40-market survey

Home fuel costs spark sales for high-efficiency equipment

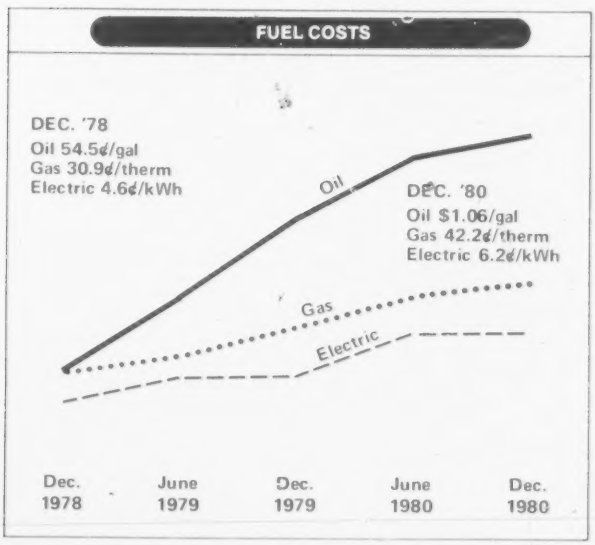


by Thomas A. Mahoney

Preliminary 1980 Census figures show the 10-year dynamism of the American home building industry, which added 19.5 million housing units to the national inventory during the 1970's.

Whatever the short-term prospects for the home building industry — and their consequences for appliance makers serving it — the existing housing stock of 88 million units offers a new kind of replacement market: one in which high-efficiency heating and air conditioning equipment becomes increasingly attractive to homeowners traumatized by sharply increased home energy costs.

A two-year look at Consumer Price Index data shown below — and for 26 of the 40 local markets that follow — shows the upward direction. Decontrol of oil has pushed its cost even higher in the past few months; likewise, deregulation of natural gas — either this year, or by the current legislative timetable — will generate a similar sharp ascent in prices.



"If all you've got is lemons, make lemonade," said one contractor who looks to a very lean year in the new house market, and who will try to increase his share of the replacement business.

A lot of lemonade-making will go on this year in the 40 markets described in this section. They include a mix of selling problems and opportunities, of climates and energy-use patterns.

Saturation patterns and housing growth data for 1980 are preliminary; a more precise picture will emerge in 1982 as additional census data are released. Average shipments of equipment are our own estimates, based on industry figures and interviews with local outlets. Consumer Price Index data are supplied by the Department of Labor. Cities are as defined in Standard Metropolitan Statistical Area (SMSA) descriptions.

Again, we thank the hundreds of people who shared local information with us.

Thomas A. Mahoney

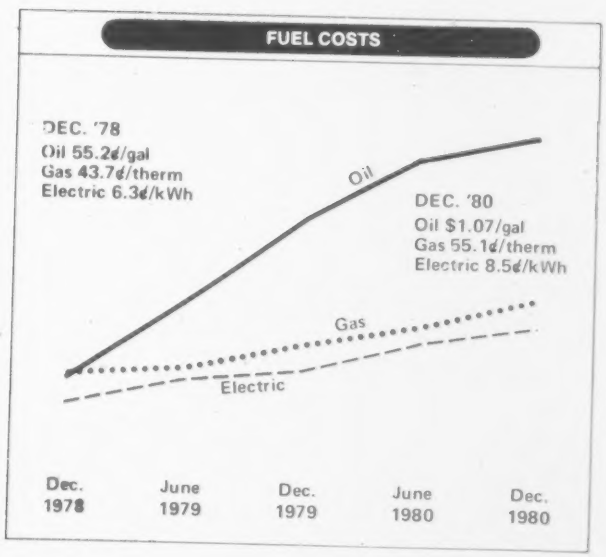
Northeast

Ten-year census figures show a net loss of one-tenth of 1% of the region's population. Average annual housing unit growth was about 1.5%, lowest among the four regions.

The erosion of oil as a home heating fuel has been accelerated by its decontrol, and by the gradual accessibility of gas in the region — although Massachusetts suffered a problem in delivery to residents, to the mortification of the utility and to the indignation of the governor.

Hydronic systems dominate here, but a steady infusion of forced air systems in new homes built in the 1970's — now at about 45% — will gradually alter this pattern.

The Northeast pays dearly for its energy. Electric rates for the region are 30% higher than the national average, as are gas prices. Oil prices are a little closer to the norm.



10-year housing units

STATE	1970 Housing Units	1980 Housing Units	% Gain
New England			
Connecticut	981,603	1,518,066	18.0%
Maine	397,182	500,773	26.1%
Massachusetts	1,890,400	2,206,443	16.7%
New Hampshire	280,962	386,401	37.5%
Rhode Island	317,689	372,513	17.3%
Vermont	165,211	223,466	35.3%
Middle Atlantic			
New Jersey	2,388,689	2,771,388	16.0%
New York	6,299,684	6,863,845	9.0%
Pennsylvania	3,927,206	4,592,181	16.9%
TOTAL	**16,648,626**	**19,075,076**	**14.6%**

Boston

Boston struggled through its coldest winter since 1885, a situation that exacerbated the home fuel situation.

After two consecutive years which saw a total of 30,000 housing units switch from oil to gas, the Boston Gas Co. imposed a ban on further new hookups — one step ahead of a state order to do so.

Gas shortages to homes, schools, and offices made national headlines, although the gas utility insists the problem is one of delivery, not the supply of the fuel. The distinction was lost on residents, who are confronted with the highest heating bills in the nation.

Local fuel oil dealers, who have seen a steady erosion of their market, have little sympathy. Deregulation of natural gas will reduce any temporary price advantage it has over oil, they say. Homeowners who convert are playing Russian roulette, one said.

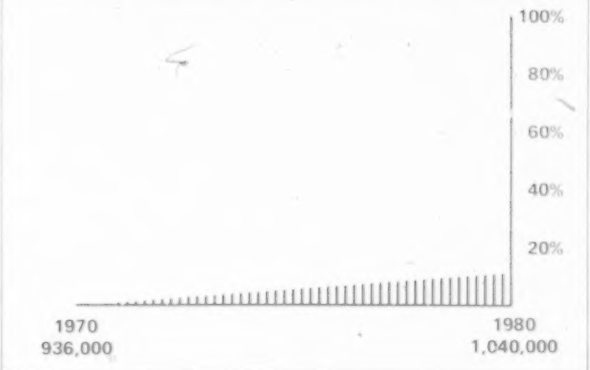
Boston air conditioning distributors concede that the entrenched position of hydronic heat has not been seriously threatened, although one distributor says that younger, more technically oriented home buyers along Boston's Route 128 are receptive to the idea of a combination heat pump-gas-fired forced air system. "They could have a significant impact on the market in the next five years," he says.

The city of Boston lost about 10,000 housing units in the decade, although the area itself added about 106,000 new units in the past 10 years.

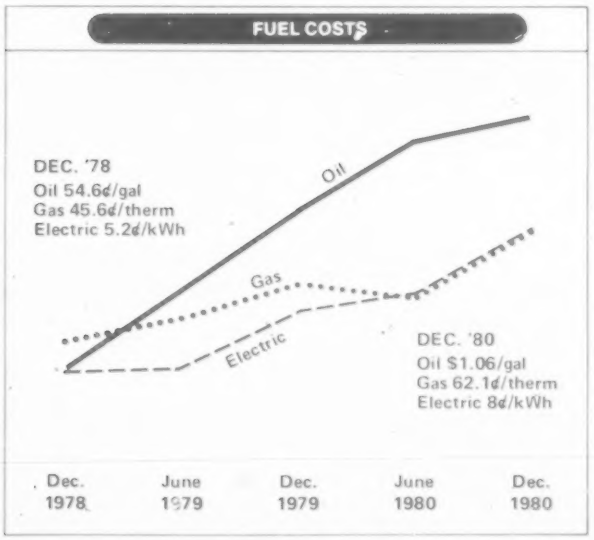
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	27%	30%
Bottled or LP gas	–	–
Fuel oil	68%	65%
Electricity	3%	5%
Other or none	2%	–
HEATING SYSTEM		
Warm air furnace	26%	26%
Steam or hot water	65%	66%
Built-in electric units	3%	4%
Floor, wall, pipeless furnace	1%	1%
Room heaters	4%	3%
Fireplaces, stoves, portable heaters	1%	–
None	–	–
COOLING SYSTEM		
Central	5%	9%
Room Unit	22%	38%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	9,000
Heat pumps	1,500
Central air conditioners	5,000
Humidifiers	5,000
Boilers	10,000
Vent dampers	4,000

Buffalo

Housing growth in the Buffalo area has developed primarily in the suburbs; the central city recorded a loss of about 10,000 housing units in the past decade.

Because of a slowdown in home construction — annual construction is now at 1,000 units — heating-cooling equipment sales will be primarily in the replacement and add-on market.

Ron Heintz of Ryan Homes, which has built 300 single-family units in the past year, says that cheap and plentiful gas has not generated a strong demand for higher efficiency heating equipment. "Most firms use standard builder furnace models as original equipment," he reports. "A new 1979 state building code mandates improvements in the thermal shell, but equipment has remained largely the same."

The area has seen a modest business in conversions from oil to gas, a switch that was made in about 2,500 homes last year, a level that will be about the same in 1981, according to Gerard Miller, an executive with the National Fuel Gas Corp.

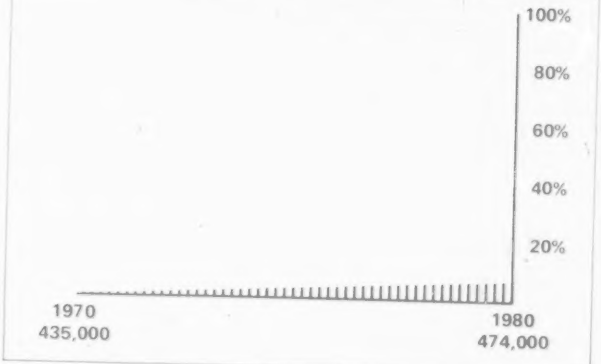
"About three quarters of those conversions will involve new furnaces, and the remaining quarter conversion burners," he says. "Most of the conversions come from the northern end of Buffalo where oil had been more prevalent." Heating systems in the more expensive homes have been — and remain — hydronic, he adds.

Automatic vent dampers, especially those of the thermally actuated variety, have been big sellers here, as they have been in other northern cities with a large stock of forced air heating systems.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	81%	90%
Bottled or LP gas	–	–
Fuel oil	15%	8%
Electricity	1%	2%
Other or none	3%	–
HEATING SYSTEM		
Warm air furnace	59%	70%
Steam or hot water	24%	20%
Built-in electric units	1%	2%
Floor, wall, pipeless furnace	3%	2%
Room heaters	12%	6%
Fireplaces, stoves, portable heaters	1%	–
None	–	–
COOLING SYSTEM		
Central	4%	10%
Room Unit	15%	25%

HOUSING GROWTH



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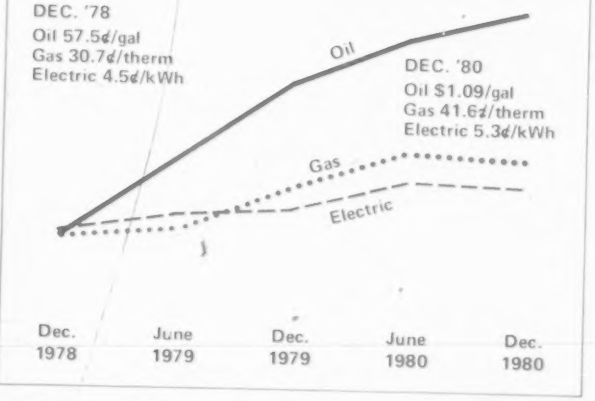


AVERAGE SHIPMENTS TO AREA

Furnaces	6,000
Heat pumps	1,000
Central air conditioners	4,000
Humidifiers	4,000
Boilers	2,000
Vent dampers	3,000

Newark

One symbol of winter in New Jersey: The residents of a 16-room, $365,000 home shoveling coal twice a day to reduce heating costs.

Heating bills in the region have strained household budgets, forcing drastic changes in lifestyles. The heat-or-eat choice is no idle speculation for many low-income families here.

Nor have the middle classes been spared. A Union City man has been paying $350 every three weeks to heat a recently purchased two-family home.

Statewide, New Jersey had about 45,000 conversions from oil to gas in the past two years, creating a strong market for conversion burners on hydronic systems and for complete new furnaces on forced air systems.

Warren Tauber, a long-time heating equipment merchandiser, says earlier exaggerated claims for energy savings on vent dampers have been replaced by more realistic savings claims.

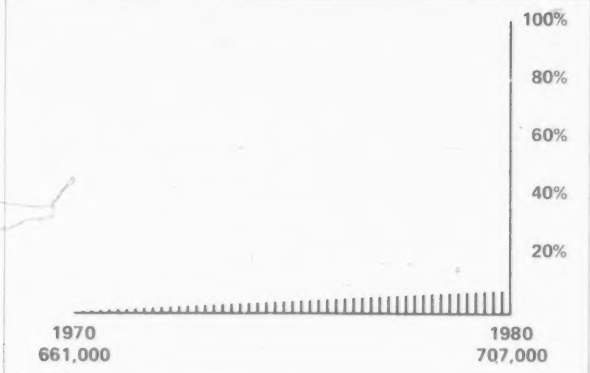
"We had guys claiming 30% energy savings. Now people are happy to get an 8% average savings from dampers. Also, consumers will pay $100 more for spark ignition on furnaces to get a 3-year payback on today's dollar."

Tom McCreesh, general manager of Dunphy-Smith, Newark distributors, believes oil and gas prices will be on a par by 1986, and that equipment choice will be based more on efficiency than on fuel use.

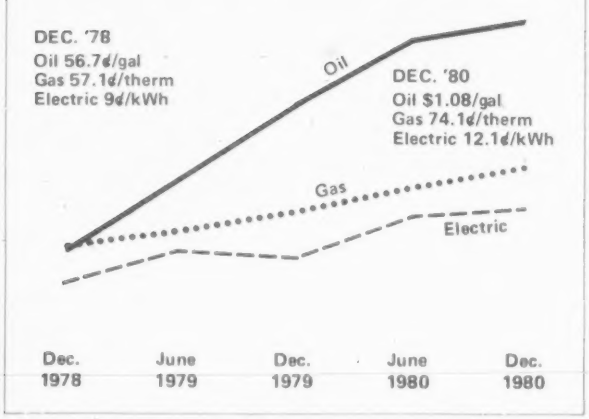
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	36%	34%
Bottled or LP gas	1%	–
Fuel oil	59%	62%
Electricity	2%	3%
Other or none	2%	1%
HEATING SYSTEM		
Warm air furnace	22%	19%
Steam or hot water	70%	77%
Built-in electric units	2%	2%
Floor, wall, pipeless furnace	1%	–
Room heaters	4%	1%
Fireplaces, stoves, portable heaters	1%	–
None	–	1%
COOLING SYSTEM		
Central	6%	20%
Room Unit	38%	55%

HOUSING GROWTH



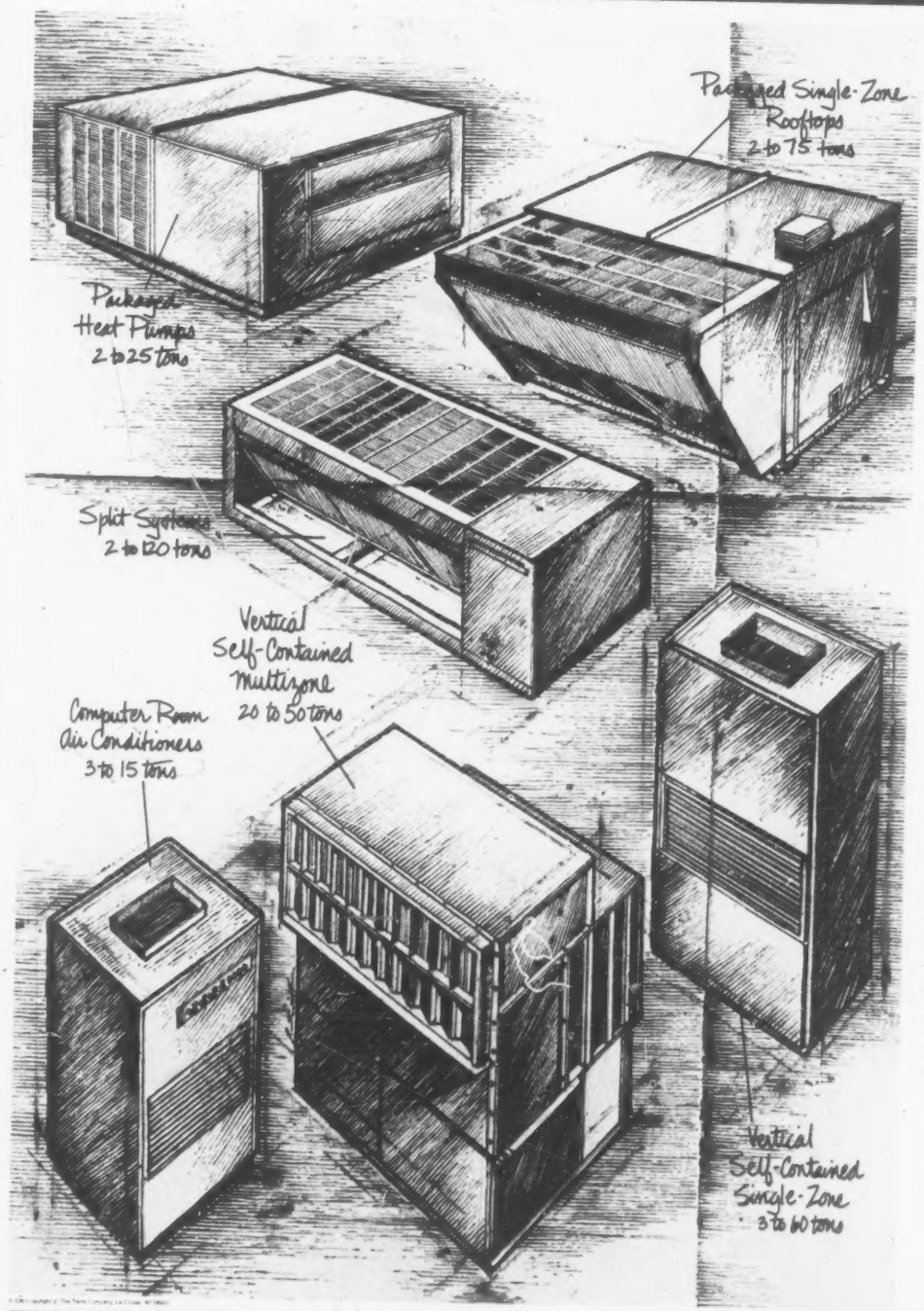
FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	5,000
Heat pumps	1,000
Central air conditioners	4,000
Humidifiers	2,000
Boilers	10,000
Vent dampers	3,000

Choose from over 100 unitary models and give your customer an Energy Fit™ HVAC system.


Packaged Single-Zone Rooftops 2 to 75 tons
Packaged Heat Pumps 2 to 25 tons
Split Systems 2 to 120 tons
Vertical Self-Contained Multizone 20 to 50 tons
Computer Room Air Conditioners 3 to 15 tons
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New York City

New York City residents, confronted with extremely high utility bills, will take energy savings anywhere they can find them.

One potential source of savings: The heat pump water heater which is being given an introductory advertising blitz in New York newspapers.

Electric water heaters have less than 5% of the local market, but one company is aiming at oil-fired water heaters as well, which have about a 70% saturation in the greater New York area.

Initial response to the ads has been very encouraging, says W. R. Light & Co., a New York distributor. Phone inquiries to the firm generally have a five-minute wait.

Housing construction in the area has been stagnant during the 1970's, with a net addition of about 90,000 new units, or an increase of less than 5%, according to Census data.

The same data show losses of 56,000 units in Bronx County and 22,000 units in Kings County.

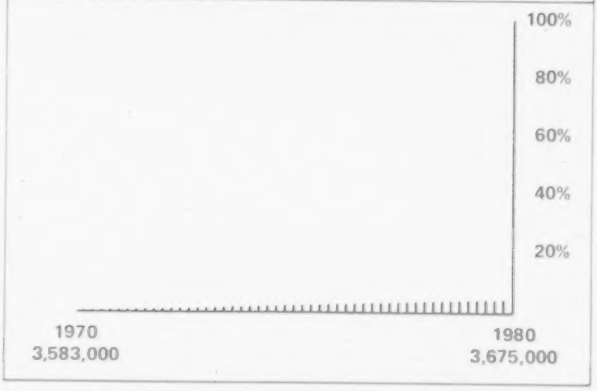
Overall, the area reflected a net loss of 892,000 in population, nearly 9% down from 1970. Local officials dispute these figures.

Energy costs have been severe. Electric rates — already at 9 cents per kWh two years ago, are now more than 12 cents; heating oil has more than doubled, and gas has increased by more than 30%.

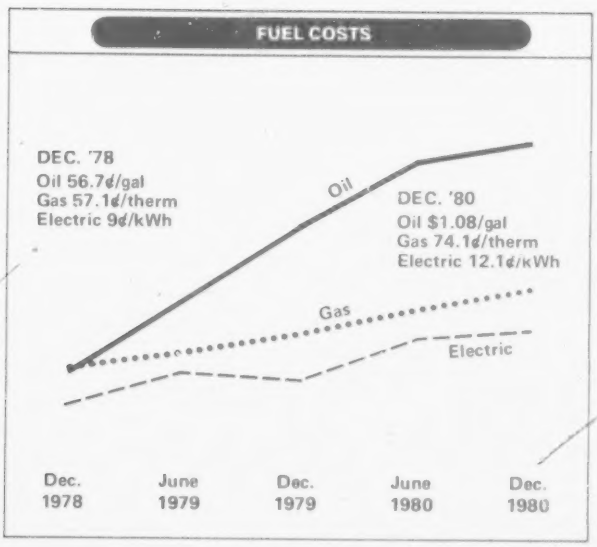
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	29%	25%
Bottled or LP gas	–	–
Fuel oil	67%	71%
Electricity	2%	4%
Other or none	2%	–
HEATING SYSTEM		
Warm air furnace	12%	12%
Steam or hot water	84%	86%
Built-in electric units	1%	–
Floor, wall, pipeless furnace	1%	1%
Room heaters	2%	1%
Fireplaces, stoves, portable heaters	–	–
None	–	–
COOLING SYSTEM		
Central	4%	7%
Room unit	40%	45%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	5,000
Heat pumps	2,000
Central air conditioners	18,000
Humidifiers	3,000
Boilers	20,000
Vent dampers	5,000

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Philadelphia

Like Boston and New York, Philadelphia has experienced a fairly strong switch from oil to gas. Some estimates put the figure as high as 35,000 conversions in the past two years.

Following an earlier demand for conversion burners — which could be only partially satisfied — the conversion now involves installing entire new heating plants in homes — either hydronic or forced air. Philadelphia has about a 50/50 split.

"For years, the local gas utility refused to do hookups to conversion burners," says Lionel Rothberg, of Germantown Plumbing and Heating Supply. "Even today, most contractors recommend new heating plants, especially on forced air systems. Efficiencies are far greater, and customers are more willing to listen to payback data than they were before."

Distributor Henry Kirschman of Acar Supply foresees a continuing strong demand for spark ignition furnaces, and the gradual extinction of standing pilot models. Fuel costs will force this change, he says, as will the change to automatic vent dampers as OEM components.

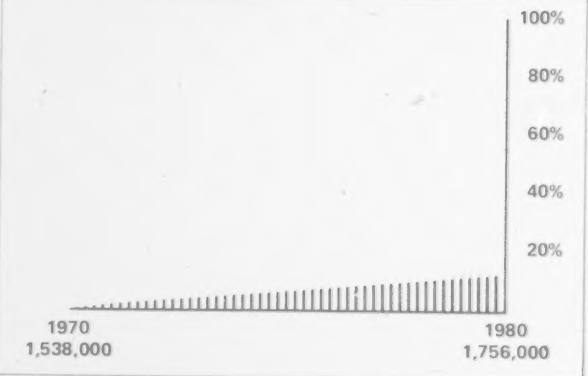
Consumer price index data show that oil has about doubled in price in the past two years, while gas has risen about 17%, and electricity has grown by 50% in the interval.

The area added 218,000 housing units in the 1970's; the Philadelphia Electric Association claims about a 48% penetration of heat pumps in the immediate 5-county area, from which most of the region's growth has come.

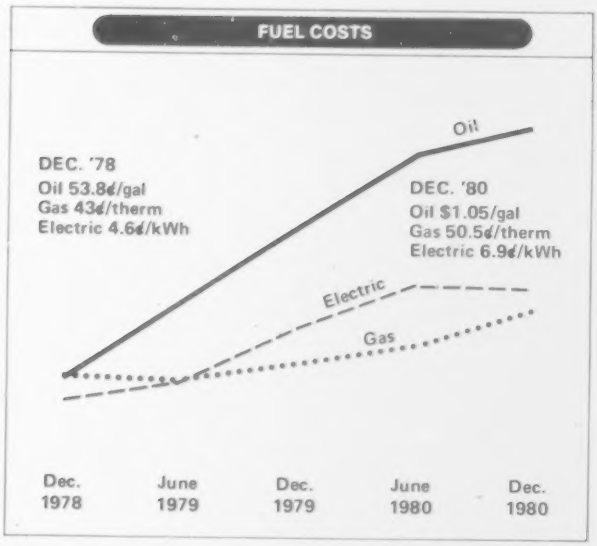
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	44%	48%
Bottled or LP gas	1%	–
Fuel oil	48%	45%
Electricity	3%	7%
Other or none	4%	–
HEATING SYSTEM		
Warm air furnace	41%	51%
Steam or hot water	48%	44%
Built-in electric units	2%	3%
Floor, wall, pipeless furnace	2%	1%
Room heaters	6%	–
Fireplaces, stoves, portable heaters	–	–
None	1%	1%
COOLING SYSTEM		
Central	10%	18%
Room Unit	44%	55%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	15,000
Heat pumps	10,000
Central air conditioners	25,000
Humidifiers	15,000
Boilers	10,000
Vent dampers	9,000

Pittsburgh

Following two successive down years for new home construction, Pittsburgh builders are shooting for a turnaround in 1981 to about 6,100 new units, compared with the 5,000 homes built in 1980.

While fewer than one home in five has central air conditioning, Pittsburgh has nevertheless built up a modest replacement business.

"I'm now replacing central units I put in back in 1969," says contractor Steve Ubinger of Admiral Heating and Cooling Co.

"Pittsburgh is a good market for humidifiers, electronic air cleaners, vent dampers . . . anything to improve indoor climate. Air conditioned offices have introduced a lot of homeowners to residential cooling."

Duquesne Light Co., one of two utilities serving the area, reports saturations of 9% for electronic air cleaners (virtually all of which are nonportable); 17% for central power humidifiers; 9% for portable humidifiers; and 13% for dehumidifiers — almost double that recorded two years earlier in 1978.

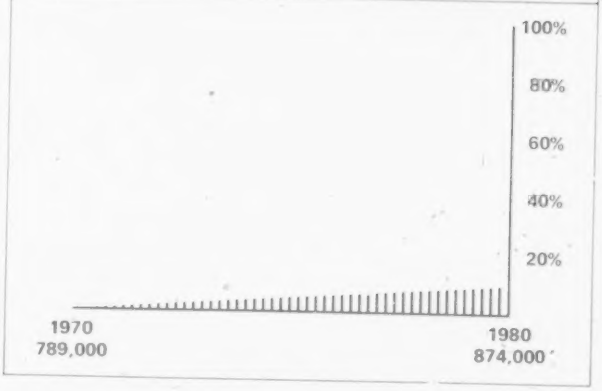
About one-third of the 85,000 housing units built in the past decade had central air conditioning. Heat pumps enjoyed a surge of acceptance as a builder item in the late 1970's, but the broader availability of gas has reasserted that fuel's dominance in the new home market.

Gas and electric rates have risen but not at the rate of oil, which has doubled in price since 1978.

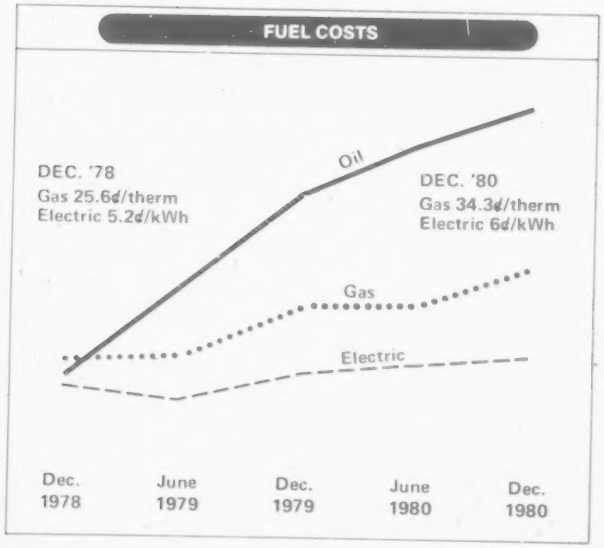
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	86%	85%
Bottled or LP gas	–	–
Fuel oil	7%	8%
Electricity	2%	6%
Other or none	5%	1%
HEATING SYSTEM		
Warm air furnace	69%	73%
Steam or hot water	21%	20%
Built-in electric units	1%	2%
Floor, wall, pipeless furnace	1%	–
Room heaters	7%	4%
Fireplaces, stoves, portable heaters	1%	–
None	1%	1%
COOLING SYSTEM		
Central	9%	12%
Room Unit	18%	24%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	14,000
Heat pumps	3,000
Central air conditioners	10,000
Humidifiers	5,000
Boilers	5,000
Vent dampers	4,000

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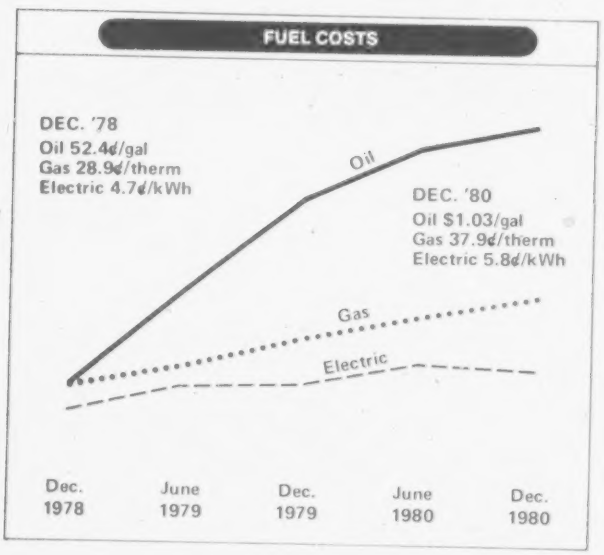
North Central

Although the number of housing units in the North Central Region increased by just under 20% in the past decade, the population grew by only 3.7%, reflecting the migration to sunbelt states.

With the opening up of gas hookups to this region in the late 1970's, a tremendous replacement market opened up. About 170,000 homes in 1979 and 140,000 last year switched to gas. The great majority of these involved new heating plants rather than conversion burners.

With its preponderance of forced air systems, the region absorbs the lion's share of power humidifiers, and, in the past two years, the bulk of retrofit vent dampers, which now are being installed in about the same volume as humidifiers.



10-year housing units

STATE	1970 Housing Units	1980 Housing Units	% Gain
East North Central			
Illinois	3,702,449	4,305,235	16.3%
Indiana	1,730,496	2,087,087	20.6%
Michigan	2,957,303	3,586,076	21.3%
Ohio	3,466,688	4,099,665	18.3%
Wisconsin	1,472,308	1,860,032	26.3%
West North Central			
Iowa	964,293	1,129,538	17.1%
Kansas	789,735	952,990	20.7%
Minnesota	1,276,552	1,610,304	26.1%
Missouri	1,673,638	1,984,413	18.6%
Nebraska	515,530	622,528	20.8%
North Dakota	204,235	258,479	26.6%
South Dakota	225,417	276,287	22.6%
TOTAL	**18,978,644**	**22,772,634**	**19.9%**

Chicago

Permits for new single and multifamily housing in the Chicago metropolitan area dropped by 55% in 1980, from 27,171 units to 12,990.

According to the Bell Federal Savings and Loan Association, which does the permit counts, single-family permits totaled 6,035 for the year, down 41%.

Permit values fell accordingly, from $3.386 billion in 1979 to $2.725 billion last year.

A silver lining showed up in January, 1981, totals, which showed a 9% increase in permits. Home builders are looking for a gain of about 10% in total units for 1981.

The residential market supports a sizeable replacement business, with upwards of 50,000 furnaces going into existing homes annually.

Bill Hochschild of Northern Weathermakers, Inc., Evanston, Ill., a 33-year veteran of the contracting business, has noticed a two-tier pattern of furnace replacement: one group includes furnaces installed in the late 1940's — very durable; the second group includes those installed in the mid-1960's — not so durable.

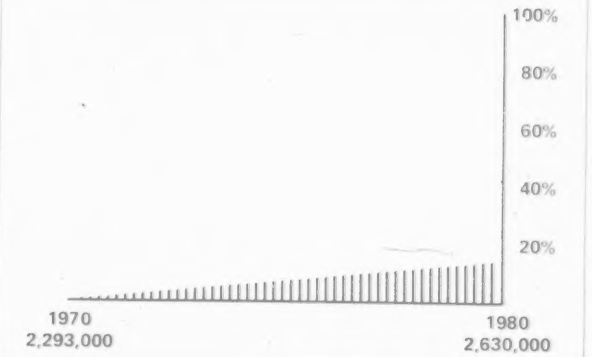
"You could probably prove that a service contract will extend the life of any home air conditioning system," he says, "but a lot of what we replaced has had a relatively short life."

Stiff price hikes for electricity — up 33% in two years — coupled with readily accessible natural gas — have prevented heat pumps from capturing more than a minor share of the central air conditioning market here.

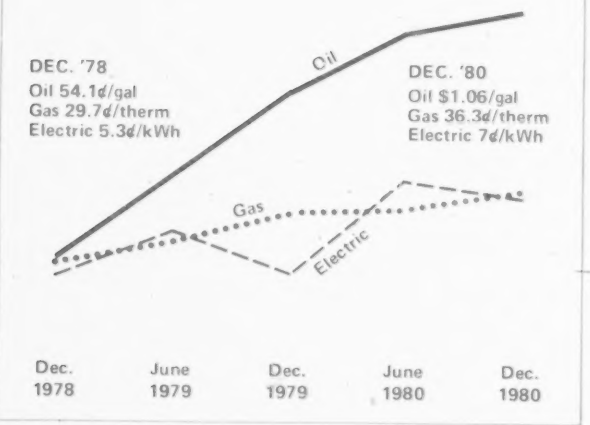
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	72%	88%
Bottled or LP-gas	1%	–
Fuel oil	14%	7%
Electricity	3%	4%
Other or none	10%	1%
HEATING SYSTEM		
Warm air furnace	45%	60%
Steam or hot water	41%	34%
Built-in electric units	3%	3%
Floor, wall, pipeless furnace	2%	1%
Room heaters	9%	2%
Fireplaces, stoves, portable heaters	–	–
None	–	–
COOLING SYSTEM		
Central	14%	28%
Room Unit	31%	55%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	65,000
Heat pumps	4,000
Central air conditioners	60,000
Humidifiers	80,000
Boilers	4,000
Vent dampers	50,000

Cincinnati

Cincinnati heating equipment distributors now have to cope with an Ohio law that requires spark ignition on all new furnaces.

Because the Cincinnati market overlaps into parts of Kentucky and Indiana — where no such requirements exists — distributors are forced into an irritating "double-inventory" situation.

The replacement market remains strong, according to Harry Feldman of Hesco Corp., a Luxaire outlet in Cincinnati.

"Electronic air cleaners and humidifiers have been a strong item for us this past year," he said. "Most of the air cleaners are first-time installations, prompted by medical prescriptions for pollen and other irritants."

Heat pumps have continued strong, claiming about 40% of the central air conditioning equipment sales. More of the heat pumps are being piggybacked on fossil fuel-forced air systems. Earlier in the 1970's, during the gas moratorium, heat pumps captured a large market share.

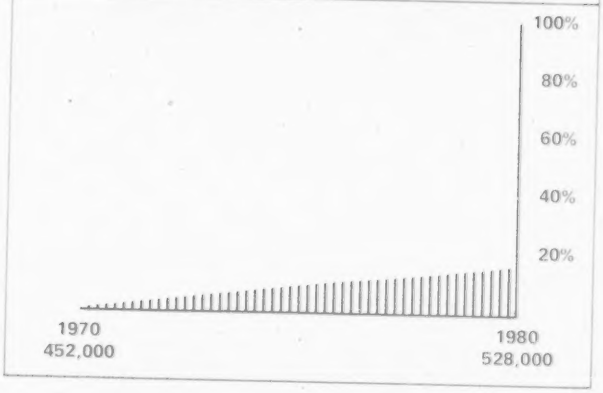
Cincinnati added 76,000 housing units to its stock in the past 10 years, a gain of 17%, according to preliminary Census Bureau figures.

The city itself added virtually no new units, remaining at about 170,000 units throughout the decade. Dynamic outstate building, especially in Hamilton County where 56,000 units were added, accounted for the net growth.

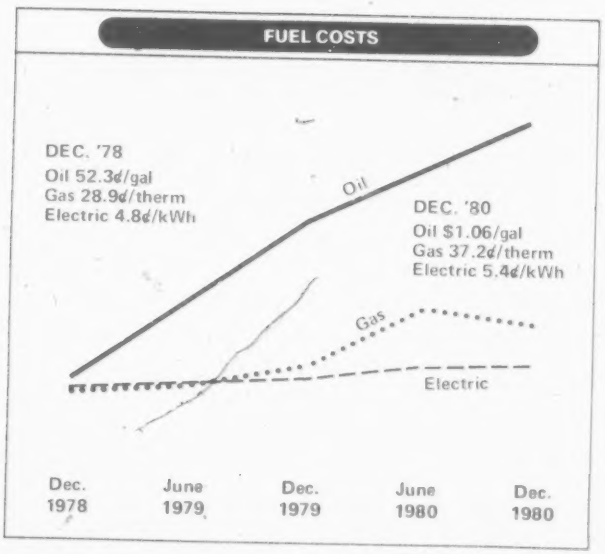
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	75%	69%
Bottled or LP gas	2%	–
Fuel oil	16%	15%
Electricity	3%	14%
Other or none	4%	2%
HEATING SYSTEM		
Warm air furnace	66%	72%
Steam or hot water	19%	17%
Built-in electric units	2%	5%
Floor, wall, pipeless furnace	2%	–
Room heaters	9%	5%
Fireplaces, stoves, portable heaters	1%	–
None	1%	1%
COOLING SYSTEM		
Central	10%	38%
Room Unit	24%	42%

HOUSING GROWTH



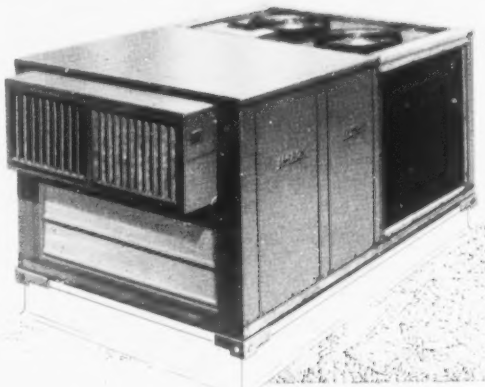
FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	6,000
Heat pumps	7,000
Central air conditioners	10,000
Humidifiers	10,000
Boilers	1,000
Vent dampers	7,000

Another Lennox Energy-Saving Breakthrough...



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Cleveland

Home construction in the Cleveland area is as bad as it has been at any time since the end of World War II, according to Jim Chiswell, director of the Cleveland Homebuilders Association.

"New home construction was down 50% in 1980 and, if we're lucky, we'll be even with last year at around 3,000 units," he says. "The average price of a new home is $90,000 and there just aren't enough people able to swing mortgages at today's interest rates."

What construction there has been in the area in the past few years has included a healthy infusion of heat pumps — a legacy of the gas moratorium of the late 1970's. About half of the single-family units now being built have heat pumps, Criswell says. "We have even seen some new homes with heat pumps as back-up systems to fossil-fueled forced-air systems."

A market study he commissioned will conclude that Cleveland will have to reduce the size of its new homes in the future, with an attendant scaling down of heating-cooling equipment.

Conversions from oil to gas have totaled about 2,000 for each of the past two years, creating a respectable demand for high efficiency furnaces.

The commercial market in Cleveland is flat, too, according to Len English, executive secretary of the local sheet metal contractors association. Unemployment in that craft has been at 25% all winter long, and contributions into the local industry fund are 30% below normal.

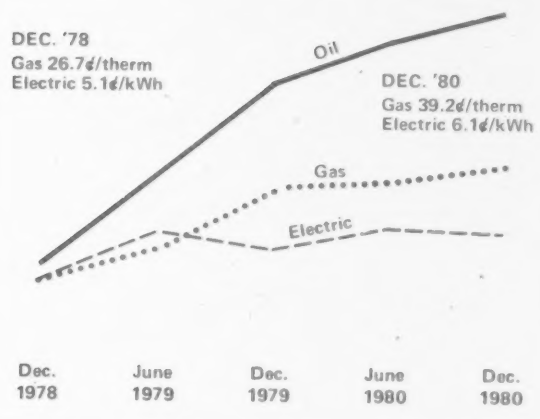
Significant volume in residential equipment will necessarily come from the replacement/retrofit sector.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	89%	90%
Bottled or LP gas	–	–
Fuel oil	6%	5%
Electricity	2%	4%
Other or none	3%	1%
HEATING SYSTEM		
Warm air furnace	71%	80%
Steam or hot water	19%	14%
Built-in electric units	1%	2%
Floor, wall, pipeless furnace	1%	–
Room heaters	6%	3%
Fireplaces, stoves, portable heaters	–	–
None	2%	1%
COOLING SYSTEM		
Central	8%	22%
Room Unit	22%	36%

HOUSING GROWTH

FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	13,000
Heat pumps	5,000
Central air conditioners	12,000
Humidifiers	8,000
Boilers	1,000
Vent dampers	6,000

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UNITED TECHNOLOGIES

Dayton

Dayton home builders look for a 10% increase in housing construction this year, following a 30% slide in 1979, according to Jacque Sheley, a home builder association executive.

This would put 1981 construction at 1,800 single-family units and 400 apartment units, most of which will be built in the second half of 1981.

The reactivation by Chevrolet Division of the Frigidaire plant is expected to generate about 4,000 jobs, kindling optimism for a general strengthening of local housing and retail sales.

Dayton is preeminently a single-family unit market. It has the smallest number of apartment units per capita of any city in the Great Lakes region — about 40,000 units. Home ownership is 73%, compared with the national average of 56%.

However, builders expect the ratio of apartments and condominiums to grow as a share of the total housing market, reflecting a national trend in this direction.

"We are bidding a number of substantial multifamily projects right now," says Rich Siefring of Airtron, Inc., a Dayton contractor.

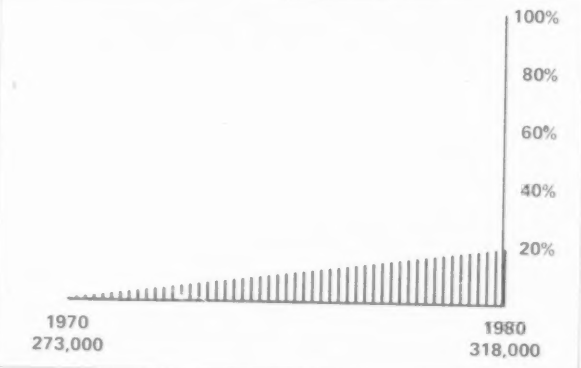
"One market that will continually improve is the multifamily construction that went up 10 to 15 years ago. That will be an ever-increasing market, both for replacement and upgrading with higher efficiency systems."

He also reports a small but growing market for geothermal systems — water-source heat pumps with electric resistance backup heating. "The payback periods shorten, especially as energy prices rise," he says.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	76%	68%
Bottled or LP gas	2%	2%
Fuel oil	16%	13%
Electricity	5%	16%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	74%	69%
Steam or hot water	9%	8%
Built-in electric units	4%	11%
Floor, wall, pipeless furnace	4%	3%
Room heaters	6%	6%
Fireplaces, stoves, portable heaters	3%	3%
None	—	—
COOLING SYSTEM		
Central	12%	25%
Room Unit	24%	30%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	5,000
Heat pumps	5,000
Central air conditioners	7,000
Humidifiers	6,000
Vent dampers	5,000

County Housing Growth

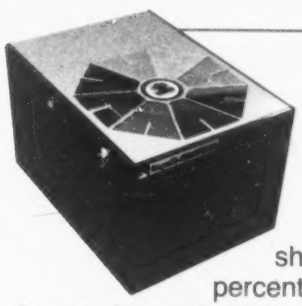
County	1970	1980	% gain
Greene	36,226	45,018	24%
Miami	27,792	33,682	21%
Montgomery	198,046	226,037	14%
Preble	10,957	13,956	27%

County Population Growth

Greene	125,057	129,904	4%
Miami	84,342	90,452	7%
Montgomery	608,413	568,353	−7%
Preble	34,719	38,182	10%

RUUD® GAINS MARKET SHARE AGAIN IN 1980

RUUD SHARE JUMPS 83% IN THREE YEARS



Again in 1980, Ruud became a bigger part of the air conditioning industry in America. Ruud increased market share by more than 17 percent in 1980. And this a year of recessionary industry sales!

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Detroit

Like residents of other northern cities, Detroit-area homeowners suffered through the past winter, paying home heating bills that jumped between 25% and 50% higher than those of the previous heating season.

January's temperatures were 12% below normal, forcing gas consumption into a "prime rate" which runs 25 cents higher per 1,000 ft³ after the first 30,000 ft³ of gas consumed per month.

Ironically, the higher heating bills have not yet compelled the purchase of higher efficiency heating equipment, even though payback periods have been cut substantially.

Flo Co Supply, a Detroit distributor, reports standard efficiency furnaces still account for about 70% of sales, although Don Landrith says that pattern will change after this year.

"Contractors are exploiting the opportunity to sell up, and they're finding it easier and easier to justify the extra bucks for deluxe heating systems."

The deregulation of oil may ease the entry of heat pumps as add-on systems in outlying areas, but heat pump applications have been sluggish despite utility promotions.

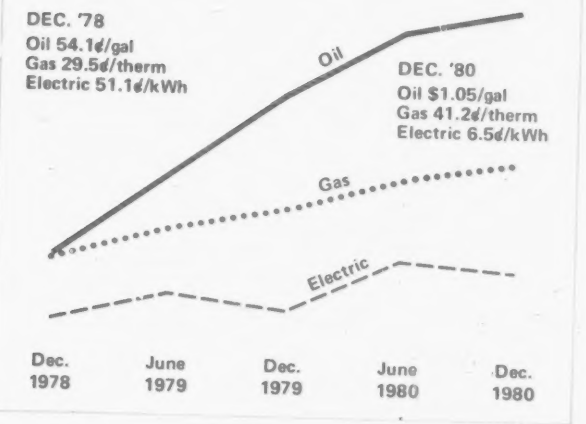
Although the city of Detroit lost 60,000 housing units in the decade, the greater 6-county area grew by 189,000 units. Strongest gainers were Oakland County (96,000 new units) and Macomb County (60,000 new units).

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	83%	90%
Bottled or LP gas	1%	–
Fuel oil	11%	8%
Electricity	2%	1%
Other or none	3%	1%
HEATING SYSTEM		
Warm air furnace	70%	80%
Steam or hot water	20%	15%
Built-in electric units	1%	2%
Floor, wall, pipeless furnace	2%	2%
Room heaters	5%	1%
Fireplaces, stoves, portable heaters	–	–
None	2%	–
COOLING SYSTEM		
Central	6%	21%
Room Unit	20%	32%

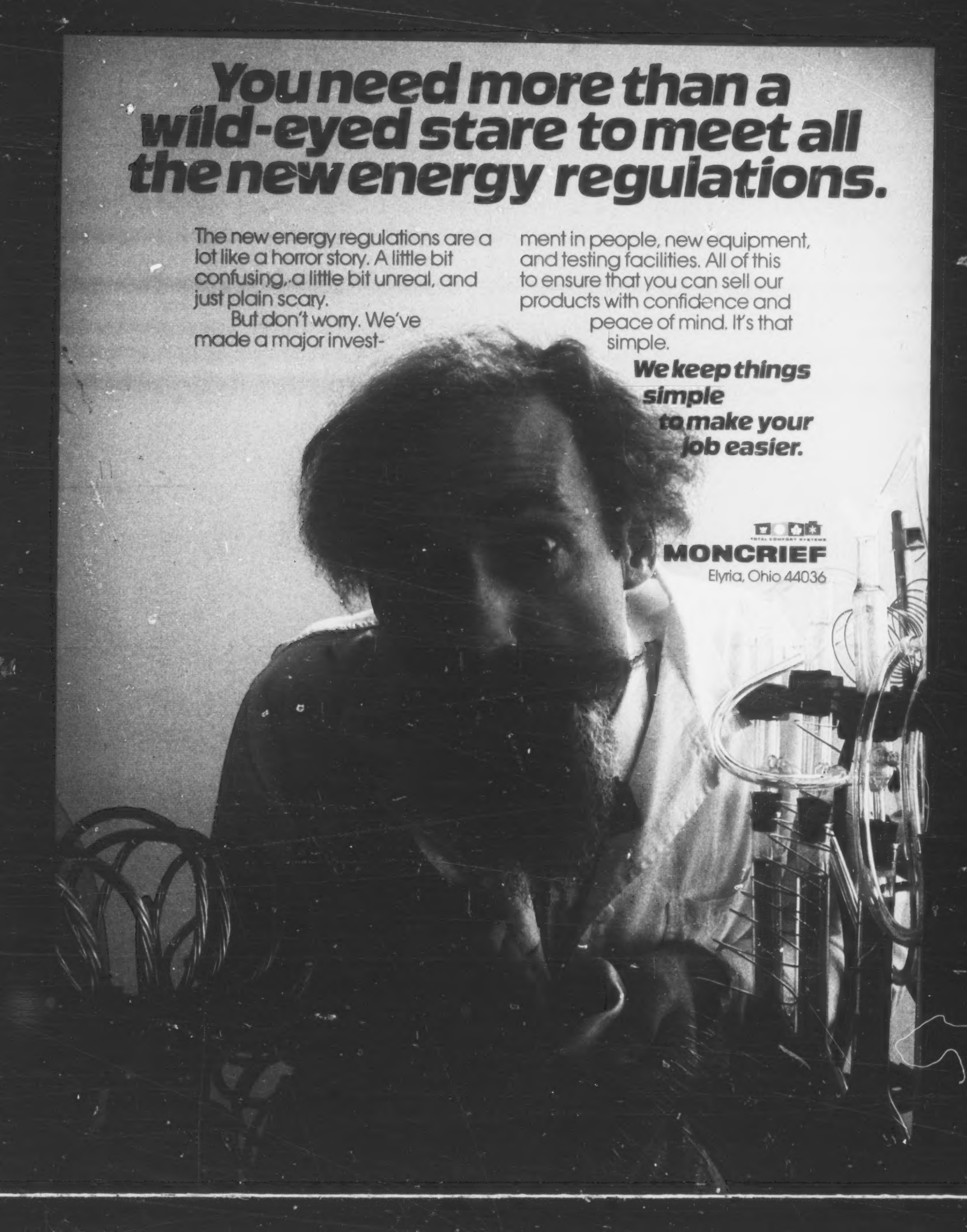
HOUSING GROWTH

FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	40,000
Heat pumps	1,000
Central air conditioners	22,000
Humidifiers	20,000
Boilers	1,000
Vent dampers	12,000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Indianapolis

The heat wave of 1980 will have to repeat itself in 1981 if air conditioning dealers are to repeat their sales volume, according to Doyle Warwick, who specializes in replacement of residential equipment.

Warwick, whose Modern Heating & Cooling enjoyed a 20% increase in sales last summer, is braced for a leaner 1981. "Everybody will have to get a lot more aggressive if we have a moderate summer," he says.

The Bryant dealer reports a phenomenon that would warm the heart of any manufacturer: "Customers are actually reading the product literature on furnaces," he says. "Take vent dampers. If the salesman doesn't point out a feature, the customer brings it up."

Result: about one-third of Warwick's furnace sales are the spark ignition/vent damper models.

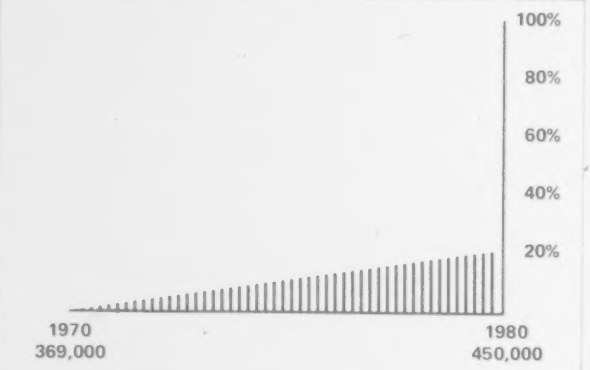
Since gas hookups opened up after a long drought in the mid-1970's, Indianapolis has charted about 4,000 oil-to-gas conversions.

During the decade, the 8-county area grew by 81,000 housing units, of which about 70% were centrally air conditioned. Electricity as a home heating fuel claimed about 40% of those homes, although this has tapered off as new gas has become available.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	55%	60%
Bottled or LP gas	3%	2%
Fuel oil	33%	25%
Electricity	6%	13%
Other or none	3%	–
HEATING SYSTEM		
Warm air furnace	70%	74%
Steam or hot water	9%	5%
Built-in electric units	5%	14%
Floor, wall, pipeless furnace	3%	2%
Room heaters	11%	4%
Fireplaces, stoves, portable heaters	1%	–
None	1%	1%
COOLING SYSTEM		
Central	18%	38%
Room Unit	22%	27%

HOUSING GROWTH



County Housing Growth

County	1970	1980	% gain
Boone	10,331	13,493	30%
Hamilton	17,321	28,981	67%
Hancock	11,217	15,161	35%
Hendricks	16,720	23,673	42%
Johnson	18,546	27,213	47%
Marion	269,407	309,134	15%
Morgan	13,706	18,246	33%
Shelby	12,625	14,936	18%

County Population Growth

Boone	30,870	36,317	18%
Hamilton	54,532	81,431	49%
Hancock	35,096	43,858	25%
Hendricks	53,974	69,320	28%
Johnson	61,138	77,085	26%
Marion	793,769	762,067	–4%
Morgan	44,176	51,821	17%
Shelby	37,797	39,640	5%

AVERAGE SHIPMENTS TO AREA

Furnaces	9,000
Heat pumps	6,000
Central air conditioners	15,000
Humidifiers	8,000
Vent dampers	6,000

Kansas City

A trend to smaller houses with more efficient furnaces shows up in a larger volume of 5-inch vent pipe, replacing 6-inch pipe, according to Everett Vaughn, of Comfort Sales Company, Inc., a Kansas City distributor.

"We noticed the shift from 6-in. pipe to 5-in. pipe last year," he says. "Tighter houses, better insulation, and more efficient equipment equal smaller pipe."

The first two months of pipe and register sales are up 20%, he says, a possible indicator of a turnaround in new housing. Many contractors have weathered the current housing downturn by getting into remodeling of HUD homes and apartments.

Kansas City is one of those markets that will absorb ever higher quantities of high-efficiency units, as energy costs mount and an extended cooling season forces ever higher equipment use.

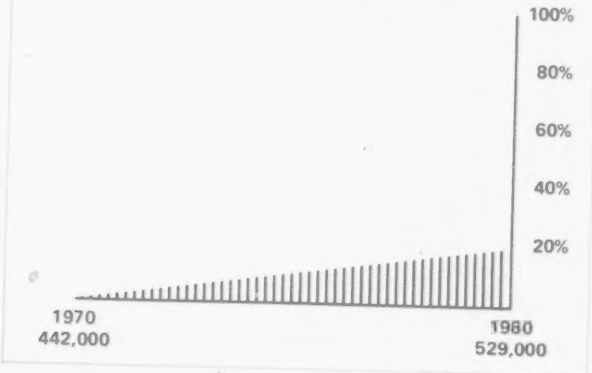
One wholesaler says that an 8 SEER (seasonal energy efficiency ratio) is the minimum efficiency customers will go for this year, and that minimum will extend to SEER's of 9 and possibly 10 in the next few years. "It's less and less a price market for climate control equipment," he says.

Nearly half of the area's 529,000 housing units have central cooling, much of it 10 years old or more. The area grew by 87,000 housing units in the past decade.

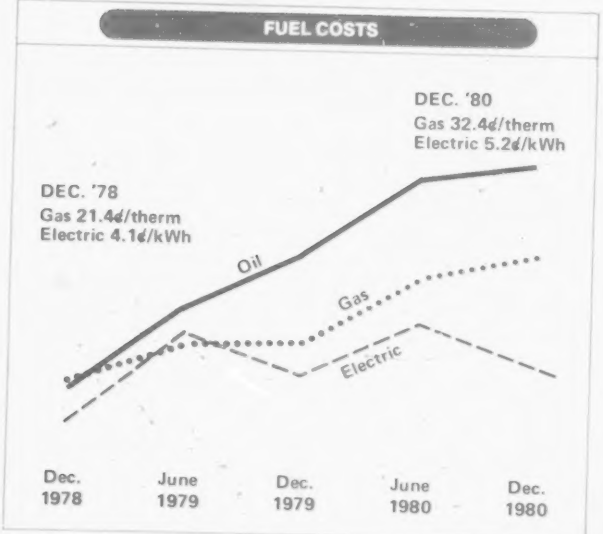
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	91%	92%
Bottled or LP gas	4%	1%
Fuel oil	2%	1%
Electricity	3%	6%
Other or none	–	–
HEATING SYSTEM		
Warm air furnace	74%	85%
Steam or hot water	11%	8%
Built-in electric units	1%	1%
Floor, wall, pipeless furnace	6%	4%
Room heaters	7%	2%
Fireplaces, stoves, portable heaters	1%	–
None	–	–
COOLING SYSTEM		
Central	22%	45%
Room Unit	36%	32%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	20,000
Heat pumps	3,000
Central air conditioners	25,000
Humidifiers	6,000
Vent dampers	5,000

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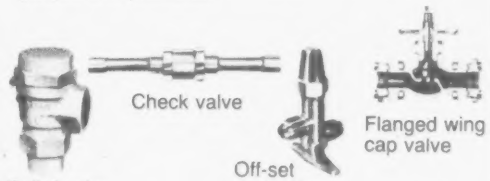

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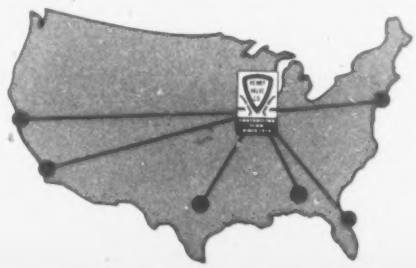

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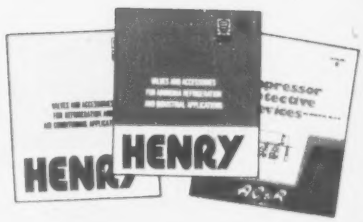

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Milwaukee

Local distributor Tom Fischer of Milwaukee Stove & Furnace Supply Corp. believes Milwaukee will be one of the pioneers for newer, more efficient heating systems.

"We've found builders receptive to the new Tappan Frigiking recuperative furnace," he says. "Customers are starting to demand efficiency as a first-cost item, and they're far more receptive to payback as a sales incentive."

Oil-to-gas conversions have averaged about 4,000 for the past two years, according to the Milwaukee Gas Co.

The state's public service commission requires gas utilities to perform an energy audit for all homes that have applied for gas service. Homeowners are required to retrofit their houses with caulking, weatherstripping, and insulation to qualify for gas service.

The move to gas throughout the state has been steady throughout the 1970's. A decade ago, 49% of homes in the state used gas; a state survey done in 1980 found that share had grown to 57%. During the same period, oil dropped from 39% to 30%.

But Raymond G. Karnes, director of the state's Oil Jobbers Association, warns that deregulation of gas will erase any temporary price advantage for that fuel.

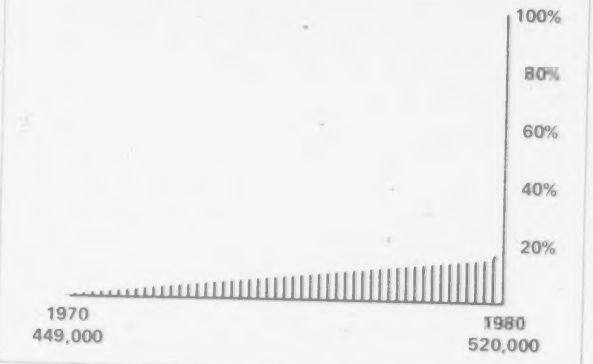
"There will be no cheap energy — not oil, gas, or electricity," he said. "Oil-to-gas conversion is a gamble."

While housing growth in the central city was negligible — 7,000 units in the decade — the area as a whole grew by 71,000 units. Key growth area was Washington County, which grew by 55%.

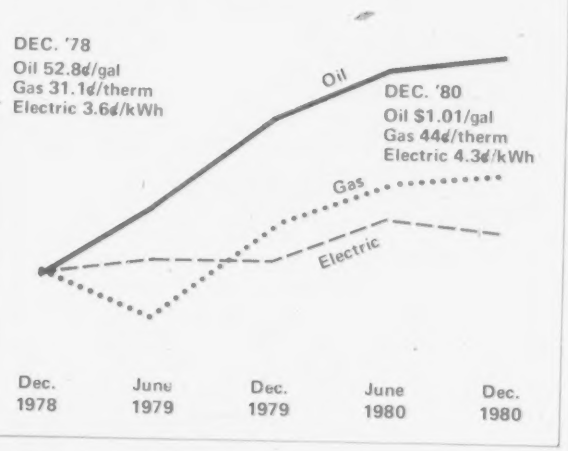
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	66%	77%
Bottled or LP gas	1%	–
Fuel oil	29%	19%
Electricity	2%	3%
Other or none	2%	1%
HEATING SYSTEM		
Warm air furnace	66%	75%
Steam or hot water	21%	23%
Built-in electric units	1%	1%
Floor, wall, pipeless furnace	1%	–
Room heaters	6%	1%
Fireplaces, stoves, portable heaters	–	–
None	5%	–
COOLING SYSTEM		
Central	5%	19%
Room Unit	22%	41%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	14,000
Heat pumps	2,000
Central air conditioners	10,000
Humidifiers	10,000
Boilers	1,000
Vent dampers	9,000

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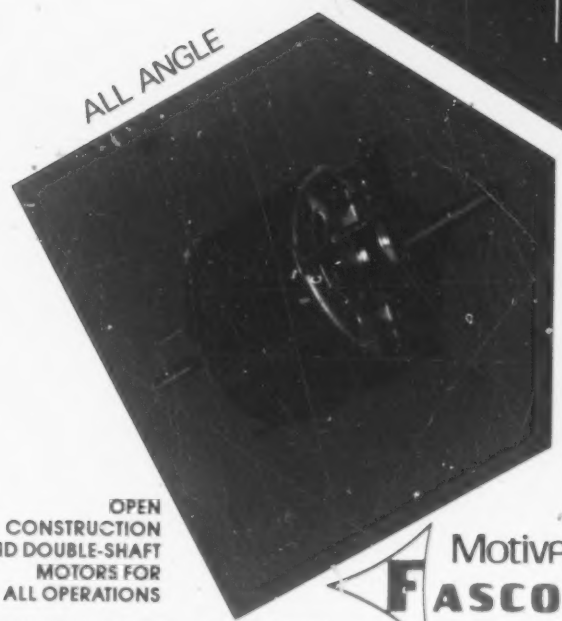

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Minneapolis

An unusually mild winter, coupled with continuing tight money, depressed the furnace replacement market in this key market area.

Distributor Tom Woessner of Ace Manufacturing Co. believes the pattern was set in late October, after a strong start, when homeowners began to hold off, and as the season wore on, decided to gamble on another year for aging heating systems.

"But heating accessories have remained strong in Minneapolis," he says. "Automatic vent dampers, humidifiers, setback thermostats have all been strong this heating season."

The service area of the Minnesota Gas Co. reported about 11,000 conversions from oil to gas in the past two years, forcing an infusion of about 9,800 new furnaces and 1,200 conversion burners into the affected housing units.

Central cooling saturation is at about 20% for Minneapolis (16% electric, 4% gas). The Northern States Power Co. believes the level will remain essentially static throughout the next five years, with gains made largely through new housing. Room unit saturation is expected to decline slightly at the same time, from a current level of about 50%.

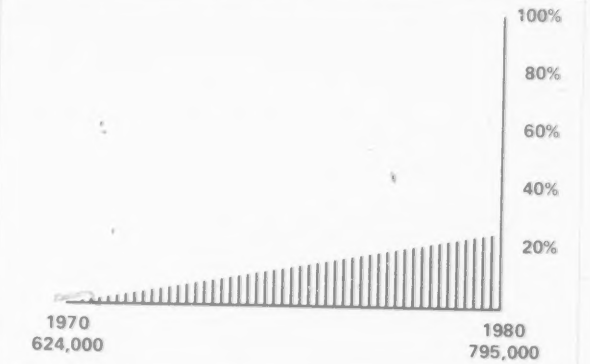
Interestingly, its surveys show a greater penetration of central air conditioning in single-family dwellings (27%) than for apartments (7%). Mobile home central cooling is put at 22%.

The area gained 171,000 housing units in the decade, according to new Census figures.

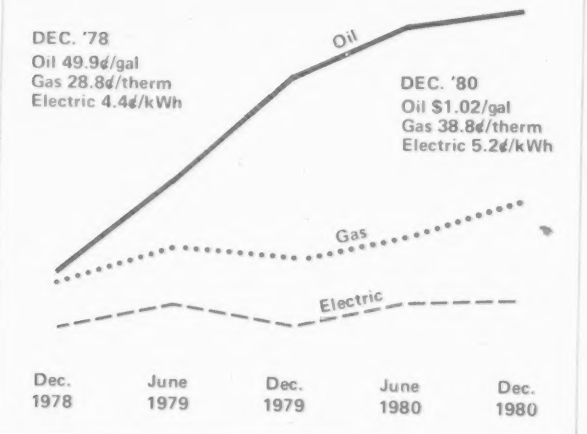
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	78%	80%
Bottled or LP gas	2%	1%
Fuel oil	16%	18%
Electricity	3%	1%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	59%	61%
Steam or hot water	33%	36%
Built-in electric units	2%	1%
Floor, wall, pipeless furnace	2%	–
Room heaters	4%	2%
Fireplaces, stoves, portable heaters	–	–
None	–	–
COOLING SYSTEM		
Central	6%	20%
Room Unit	36%	45%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	25,000
Heat pumps	2,000
Central air conditioners	20,000
Humidifiers	10,000
Boilers	2,000
Vent dampers	8,000

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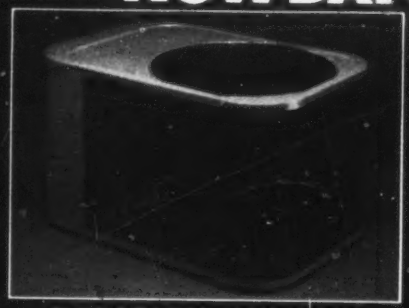

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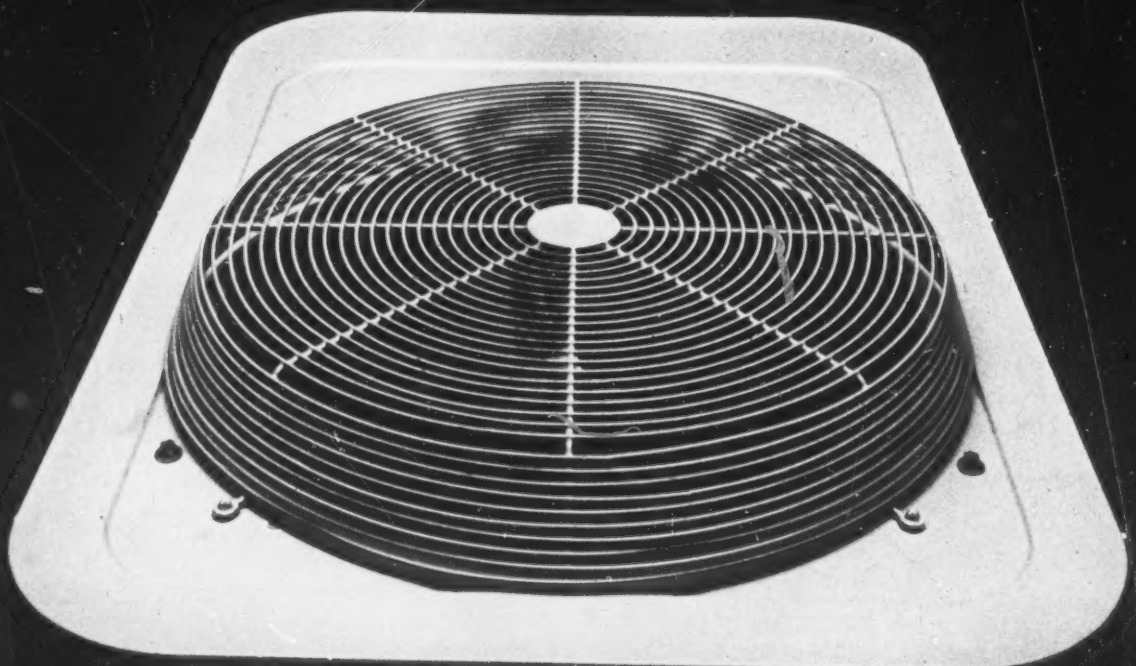

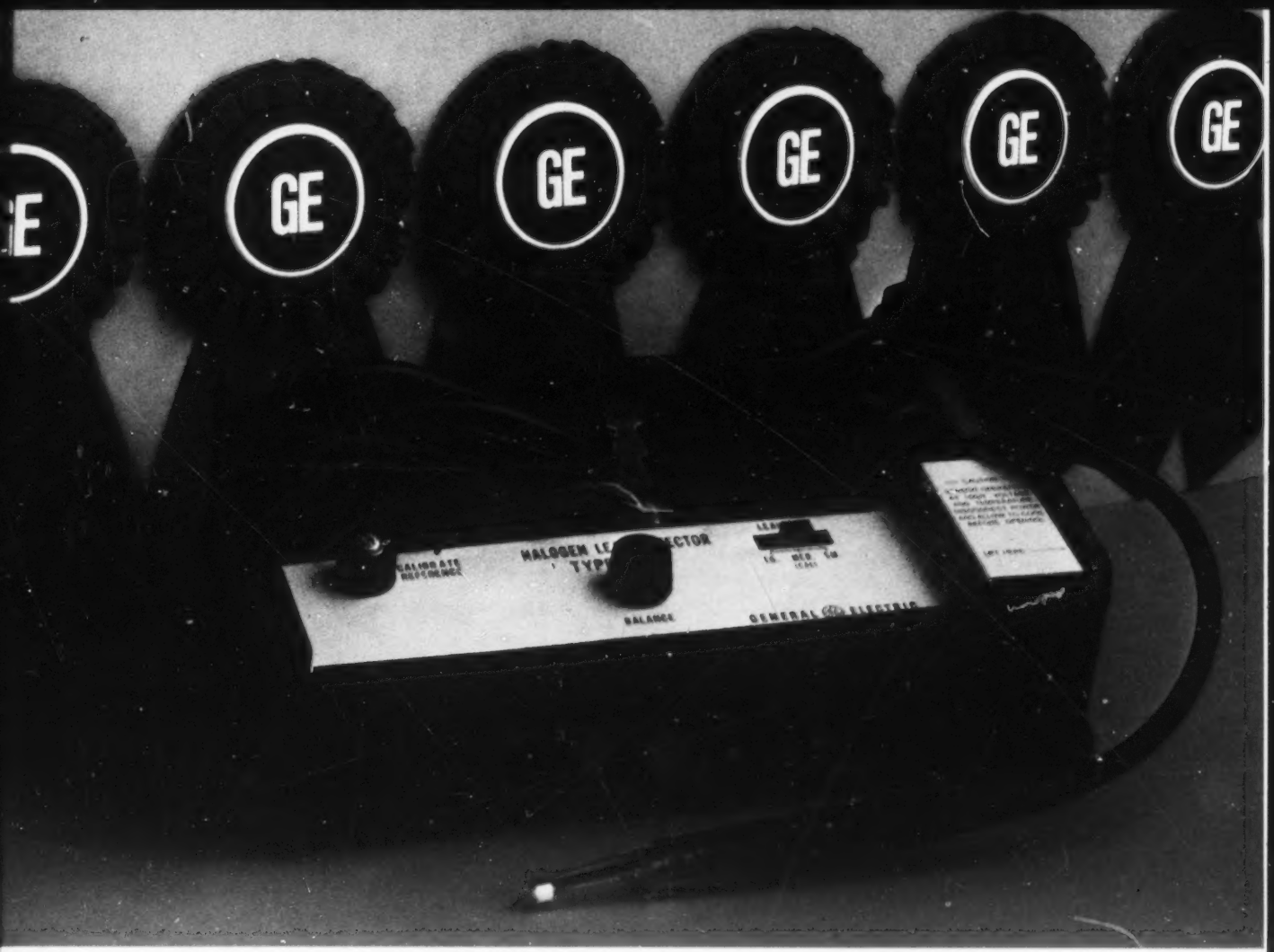

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Omaha

Omaha heating equipment distributors are frustrated by a local city requirement that all new furnaces be equipped with electronic ignition. Because this requirement is not uniform throughout the entire Omaha marketing area, distributors are required to keep a double inventory to satisfy other areas whose requirements are not as strict.

Dean Nunn, president of the Albert O. Jensen Wholesale Furnace & Supply Co., says bordering Iowa also is preparing to make spark ignition mandatory, further confusing the issue.

"We're willing to go either way — spark or standing pilot — but we need some consistency," he says.

Although normally an excellent replacement market, Omaha has not performed as expected this winter, he says, largely because of tight money. "But the delay in replacing equipment just adds to the pent-up demand for new heating-cooling systems."

Housing growth in the decade has been vigorous, with about 40,000 units added — the great majority of which were equipped with central air conditioning.

Heat pumps have gone into less than 5% of the new homes; their use has been largely as a replacement item, and as a supplementary heat system for a forced-air system.

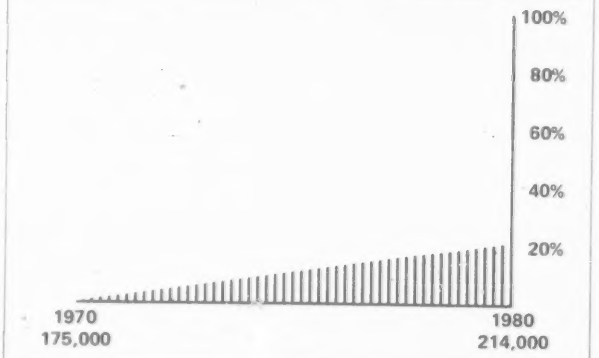
Sixty miles to the south in Lincoln, the city council is studying the feasibility of retrofitting 15,000 furnaces and water heaters with vent dampers — at $150 per installation.

Cengas, the local gas utility, now thinks it can get under way with this voluntary program in August. Details on financing have yet to be worked out.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	86%	80%
Bottled or LP gas	3%	3%
Fuel oil	8%	5%
Electricity	3%	12%
Other or none	–	–
HEATING SYSTEM		
Warm air furnace	81%	89%
Steam or hot water	9%	5%
Built-in electric units	2%	3%
Floor, wall, pipeless furnace	2%	1%
Room heaters	5%	2%
Fireplaces, stoves, portable heaters	–	–
None	1%	–
COOLING SYSTEM		
Central	30%	60%
Room Unit	35%	30%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	10,000
Heat pumps	2,000
Central air conditioners	14,000
Humidifiers	8,000
Vent dampers	6,000

County Housing Growth

County	1970	1980	% gain
Douglas	129,842	154,825	19%
Sarpy (Iowa)	17,527	27,361	56%
Pottawattamie	28,121	32,329	15%

County Population Growth

Douglas	389,455	394,928	1%
Sarpy (Iowa)	66,200	84,971	28%
Pottawattamie	86,991	86,241	–

St. Louis

What kind of a winter has it been in St. Louis?

"I had three guys bidding against me for a single furnace replacement job, and they were all ready to rip out the old unit the next day," says Bob Dressel, a local dealer.

"Weatherwise, we've had a mild winter, so replacement business has been down. I've tried to keep a strong presence in the modernization business, which has been fairly steady. Quite a few of my competitors are looking at the remodeling market with new interest, too," he says.

The area saw a quickening of electric heat saturation during the decade, especially in the late 1970's when gas was scarce. However, 1980 saw a slackening of this fuel's growth. Heat pump installations dropped from the range of 4,500 units annually to less than half of that last year.

In all, electric heat applications were down about 30% for the first half of 1980, according to the Union Electric Co.

Like other older cities, St. Louis itself has suffered a net loss of housing units — about 35,000 units since 1970.

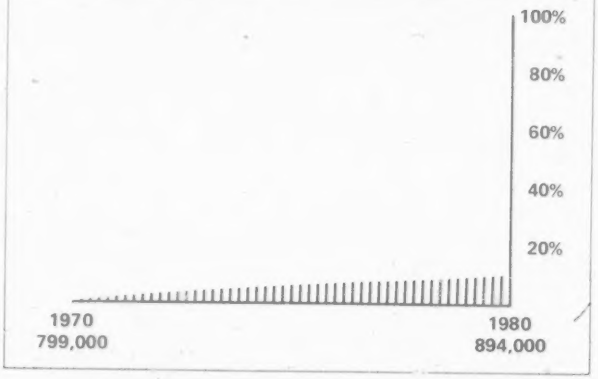
However, fast-growing surrounding counties added 95,000 new housing units to the area, which includes four counties in Illinois. St. Louis County itself grew by 64,000 housing units in the decade.

Generally, gas and electric prices have been moderate compared with national averages, although oil has risen sharply following decontrol.

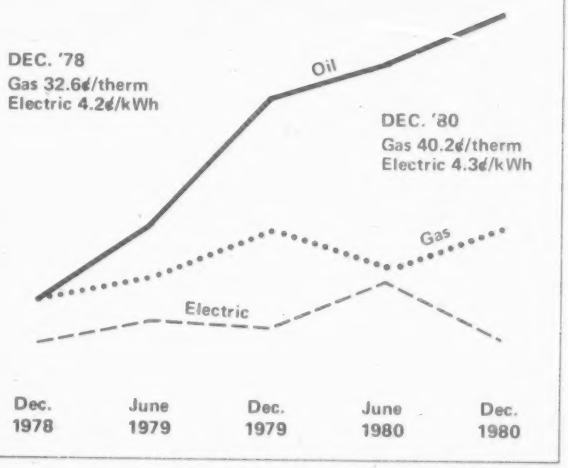
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	77%	76%
Bottled or LP gas	6%	5%
Fuel oil	12%	8%
Electricity	3%	10%
Other or none	2%	1%
HEATING SYSTEM		
Warm air furnace	70%	83%
Steam or hot water	15%	9%
Built-in electric units	2%	2%
Floor, wall, pipeless furnace	2%	1%
Room heaters	10%	5%
Fireplaces, stoves, portable heaters	1%	–
None	–	–
COOLING SYSTEM		
Central	28%	53%
Room Unit	30%	38%

HOUSING GROWTH



FUEL COSTS



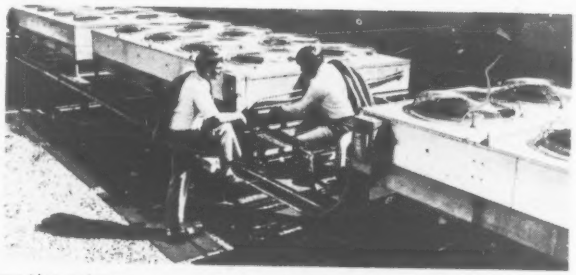
AVERAGE SHIPMENTS TO AREA

Furnaces	25,000
Heat pumps	5,000
Central air conditioners	30,000
Humidifiers	5,000
Boilers	500
Vent dampers	4,000

The Halstead & Mitchell objective approach:

Install a more efficient cooling system, provide economical heat recovery, reduce operating and energy costs by $63,000 per year.

Halstead's broad product line, with more options, made it happen. Affording the "first-best" solution without compromise.



And it all happened at Worthington Industries in Columbus, Ohio. Recently they expanded their nitrogen generating facility that serves the steel annealing furnaces.

Cooling the system efficiently was the prime concern. And water circulating through the cooling tower was causing a major problem. Scale build-up.

Maintenance and water costs had already risen to unacceptable levels, and expanding the cooling tower water treatment system would have more than doubled the expenses.

Halstead and Mitchell and Worthington engineers determined the "first-best" solution would be a closed-circuit dry cooling system. The bottom line showed that savings would be tremendous.

Without compromise, Halstead and Mitchell was able to specify the exact equipment required by the engineers' calculations. Three H&M GLY-152 Glycoolers, pumping a 50% water/glycol solution, were installed on the roof. Each circuit has a separate pump operating on short cycles, and since the system does not run at full capacity continually, any one pump can be shut down for service without disrupting the entire system.

The system is monitored on a lighted control panel that provides operating personnel a "quick view" of the current status of the system and what phase it is in. When lower ambient temperatures are reached, a multi-stage thermostat cycles the fans, thereby reducing operating costs.

And, as originally determined, operating costs have lowered tremendously. Average annual savings are between $40,000 and $50,000.

Additional savings came from heat recovery. The Glycoolers were dissipating over 4 million BTU/hr, and since the maintenance department was expanded at the same time, the heat could be used in that area. An H&M GLY-76 Glycooler was carefully positioned to provide the most efficient free-air flow. Fans are thermostatically controlled to cycle in groups as the temperature within the building demands. They run very quietly and keep the area comfortable, without any auxiliary heat, even when the outside temperature dips as low as 15°.

Based on the current gas rate of $3.14 per therm., and 80% burn efficiency, the heat recovery system will save over $23,000 per year. (And even more as gas rates increase.)

That means both systems combined save Worthington Industries over $63,000 yearly.

Obviously, they are pleased with the results.

H&M knew they would be. Our policy for specifying, designing and manufacturing heat transfer products is simple..."The right combination of components that will provide the most energy efficient service."

And only H&M gives you that objective approach to any air-conditioning or refrigeration problem. Simply because we manufacture every component necessary. Our broad line of products offers more options to specify the right combination of components without sacrificing the quality of the system. Never a need to substitute a "second-best" product.

Be objective! Work with H&M and be assured. The solution will be the first-best. You'll be satisfied, and so will your customer. And that's our first objective.

Halstead & Mitchell, Highway 35 North, Scottsboro, AL 35768, (205) 259-1212.

Halstead & Mitchell
A DIVISION OF HALSTEAD INDUSTRIES INC.

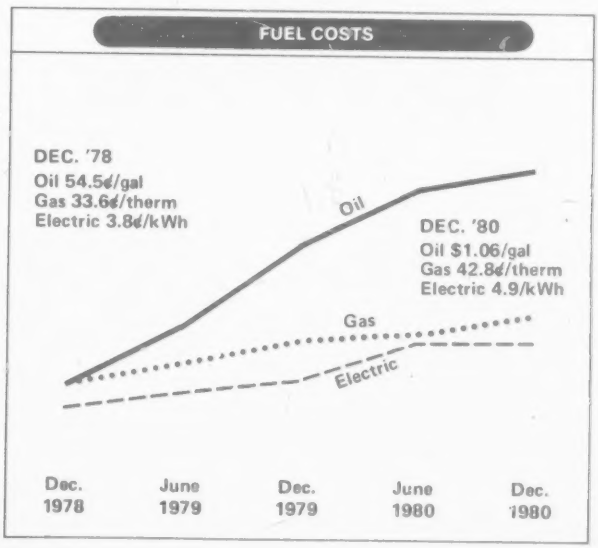
South

A 40% increase in housing units over the past 10 years reflects the shift in population to the sunbelt area. Nearly half of new single family homes are built in the south, and all but a few of these now have central air conditioning.

Texas and Florida between them added 3.5 million units. The region in aggregate accounted for 42% of the new units added to the national inventory in the past decade.

States served by energy supplied by the Tennessee Valley Authority (TVA) have benefitted from low electric rates — an economic advantage that may be weakened in the 1980's, as TVA's own cost of producing electricity is passed on to customers.

A decade ago, the south accounted for 30.6% of the national housing stock; today, it has 33.3%, a share that is expected to grow.



10-year housing units

STATE	1970 Housing Units	1980 Housing Units	% Gain
South Atlantic			
Delaware	180,233	238,782	32.5%
District of Columbia	278,327	278,915	0.2%
Florida	2,527,596	4,365,873	72.7%
Georgia	1,470,754	2,021,207	37.4%
Maryland	1,249,814	1,570,939	25.7%
North Carolina	1,642,015	2,271,105	38.3%
South Carolina	815,309	1,147,866	40.8%
Virginia	1,493,939	2,017,487	35.0%
West Virginia	597,266	745,822	24.9%
East South Central			
Alabama	1,120,239	1,466,436	30.9%
Kentucky	1,064,826	1,367,301	28.4%
Mississippi	699,178	909,023	30.0%
Tennessee	1,301,490	1,748,252	34.3%
West South Central			
Arkansas	675,620	897,889	32.9%
Louisiana	1,150,950	1,546,552	34.4%
Oklahoma	939,564	1,233,764	31.3%
Texas	3,830,091	5,543,123	44.7%
TOTAL	**21,037,211**	**29,370,336**	**39.6%**

Atlanta

In the homely phrase of Bill Eckes, a long-time Atlanta climate control expert, a central air conditioner has a life similar to that of a dog.

"A dog is middle-aged at 7 years, and after that age he can die at any time," Eckes says. "So can an air conditioner."

The current stock of about 175,000 central air conditioners in the Atlanta area remains the best source of business for local contractors.

The newer, more energy-efficient units with extended lives will lengthen that replacement period. "Better design and a low amperage draw on the compressor will prolong equipment life on the new units, but there are still plenty of older, low-efficiency units up for replacement every year," he observes.

New-home construction is down markedly in the area. One large-volume cooling contractor boasts that his firm alone could accommodate all of the new housing going up right now.

The estimated 400 dealers in the Atlanta area will be going after the replacement market in 1981.

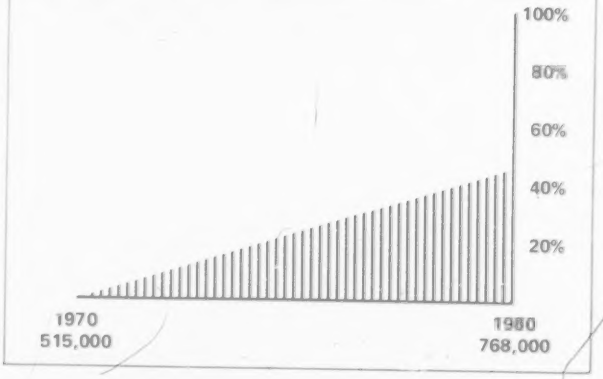
It's a gas-rich region, dampening any dramatic breakthrough for heat pumps, although they are increasingly popular as a new-home component.

Georgia Power Company estimates heat pumps have a 2% saturation, or about 5,000 homes; and that central air conditioning is found in about 180,000 homes, a 49% saturation level. Gas cooling units also are found in about 5% of its homes, representing about 18,000 units.

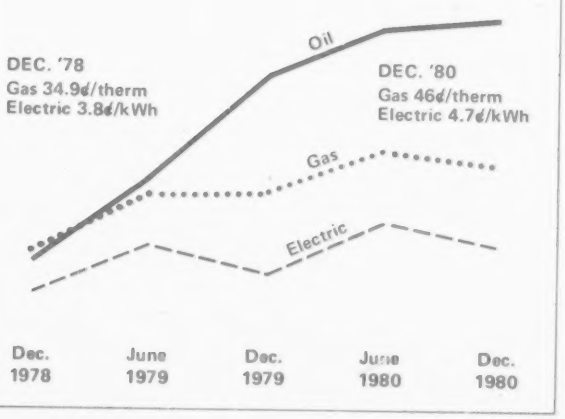
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	82%	77%
Bottled or LP gas	4%	3%
Fuel oil	2%	1%
Electricity	10%	19%
Other or none	2%	–
HEATING SYSTEM		
Warm air furnace	55%	72%
Steam or hot water	4%	3%
Built-in electric units	5%	3%
Floor, wall, pipeless furnace	13%	11%
Room heaters	16%	10%
Fireplaces, stoves, portable heaters	1%	1%
None	6%	–
COOLING SYSTEM		
Central	25%	52%
Room Unit	33%	25%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	40,000
Heat pumps	6,000
Central air conditioners	45,000
Humidifiers	10,000
Vent dampers	2,000

Baltimore

"It's been a very rough winter for heating-cooling contractors," says John Caldwell, sales manager for Roche & Hull, distributors.

"If they didn't have the foresight last fall to line up maintenance or service contract business ahead of time, or promote their accessory business, they came up against a very tough selling situation."

High-efficiency furnaces are starting to take hold in Baltimore, he says, citing some outlets that have sold them as "loss leaders." Also, the premium paid earlier for spark ignition on furnaces has been reduced, making homeowners more willing to pay for them — as they will for vent dampers as an OEM component.

Because gas prices have stayed close to national averages, conversion from oil to gas furnaces has stayed in the range of 3,000 to 4,000 units annually. "We've seen oil furnaces ripped out after one year of service," says Walter Blatt, Jr., president of United Supply.

Heat pumps have grown significantly in popularity, especially in the outlying counties.

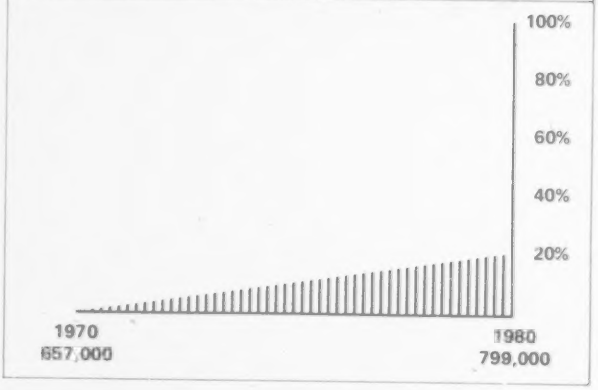
Calvert County has a 22% saturation of heat pumps, and Howard County has a 14% saturation. In all, they claim a 4% share of homes served by the Baltimore Gas & Electric Company.

Baltimore itself lost about 3,000 housing units in the decade, but the six-county area grew by 142,000 housing units since 1970.

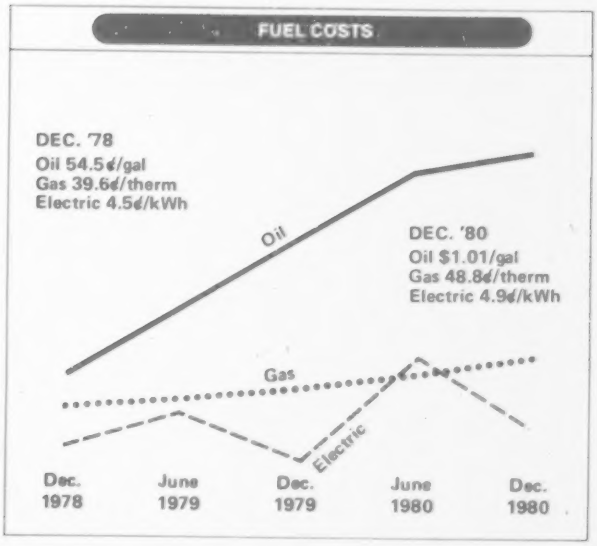
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	47%	51%
Bottled or LP gas	1%	–
Fuel oil	46%	41%
Electricity	4%	7%
Other or none	2%	1%
HEATING SYSTEM		
Warm air furnace	47%	55%
Steam or hot water	37%	36%
Built-in electric units	3%	4%
Floor, wall, pipeless furnace	3%	2%
Room heaters	8%	3%
Fireplaces, stoves, portable heaters	1%	–
None	1%	–
COOLING SYSTEM		
Central	18%	42%
Room Unit	28%	38%

HOUSING GROWTH

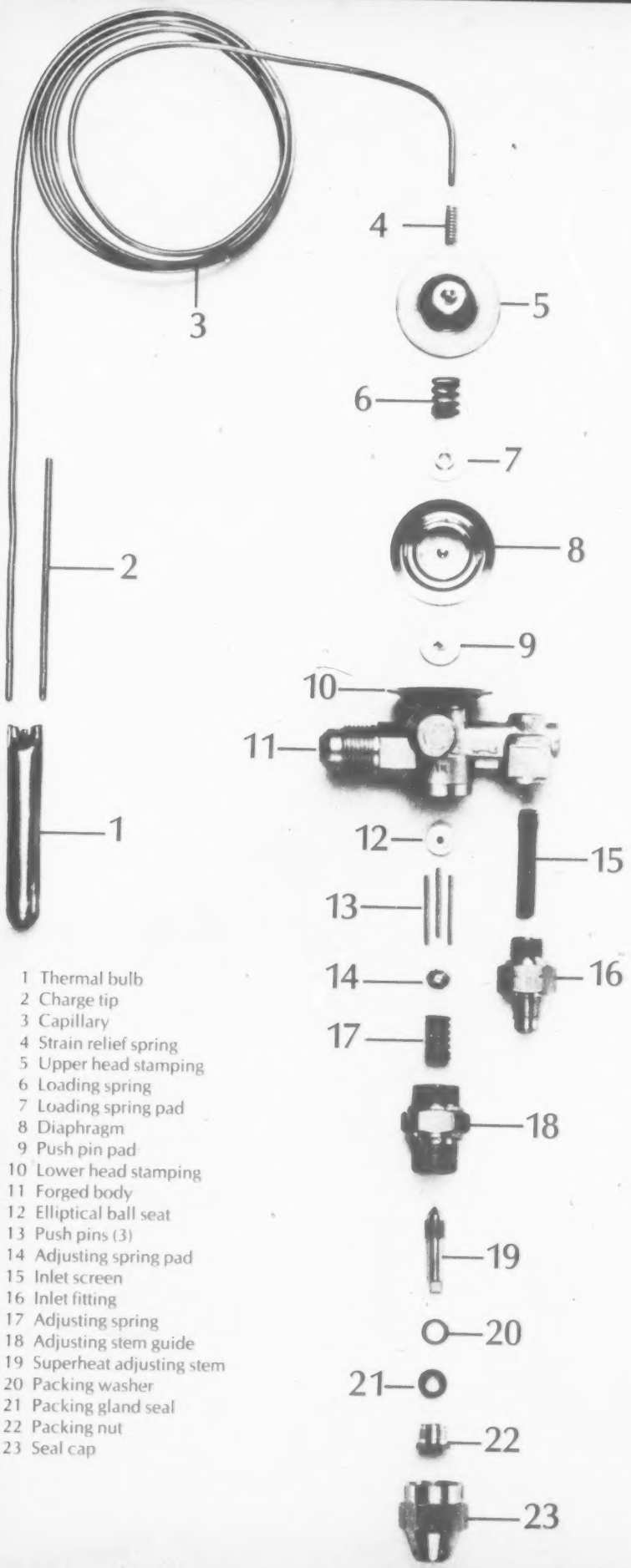


FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	5,000
Heat pumps	10,000
Central air conditioners	15,000
Humidifiers	8,000
Boilers	2,000
Vent dampers	7,000



1 Thermal bulb
2 Charge tip
3 Capillary
4 Strain relief spring
5 Upper head stamping
6 Loading spring
7 Loading spring pad
8 Diaphragm
9 Push pin pad
10 Lower head stamping
11 Forged body
12 Elliptical ball seat
13 Push pins (3)
14 Adjusting spring pad
15 Inlet screen
16 Inlet fitting
17 Adjusting spring
18 Adjusting stem guide
19 Superheat adjusting stem
20 Packing washer
21 Packing gland seal
22 Packing nut
23 Seal cap

For valves used in refrigeration service, there's one common problem: corrosion. But there are 23 answers to that problem in our A-P Model 223 TXV. Each of its 23 components – from its brass body to its stainless steel strainer screen – is made of non-corroding materials to prevent disgruntled callbacks from distressed customers.

The 223 features right angle flow, the contractor's favorite configuration. You can easily install it close to the evaporator inlet. Because of its compact size, made possible by a durable stainless steel head and unique stainless steel diaphragm, it fits easily in tight quarters. You can install it quickly.

To end a common installation hassle, a strain relief spring is located on the capillary tube. This strengthens and protects the capillary if it is bent or strained during installation.

Simplified system maintenance

We don't need to make our 223's head replaceable. And you don't have to carry spare heads. This is a testimony to the fact that the diaphragm in A-P's 223 just doesn't fail. And the head weld just doesn't leak.

Singer's 223 head is constructed of stainless steel for good reasons. Sure, it's more expensive to produce. But under the corrosive effects of moisture, or in the

23 corrosion-proof reasons to install Singer A-P 223 TXV's

toughest, most acidic environments, A-P TXV's won't corrode.

Within the head is a diaphragm just .004" thick. It's secured within the head by a special heliarc welding procedure. The welding process is the moment of truth in valve manufacturing. Too much heat during welding and diaphragm cracks may result. Too little heat: A leaker. We've mastered this welding technique to such a point that you can be sure you won't get a leaker.

The 223's diaphragm is also stainless steel. The design is exceptionally sensitive, remarkably tough, proved in millions of commercial and automotive applications. It is designed to function for years, longer than any competitive valve.

In contrast to the critically centered needle valve which operates some valves, the A-P 223 has an elliptical stainless seat and stainless ball. The ball always fits perfectly into the seat and provides precision flow control with a shorter stroke than needle valves.

Three push pins, rather than the conventional two, create a stable operating platform for the diaphragm. Push pin packing is not used on externally equalized 223's. Why? Because we can maintain pinhole tolerances of .0005" in manufacturing. You can be sure the diaphragm reacts solely to the external equalizer force.

Trouble is designed out

To provide a problem-free seal, the 223 TXV features an adjustable packing gland on the superheat adjusting stem. Should the packing gland wear after many adjustments, a secondary seal at the cap edge serves as added protection.

You'll find the removable inlet strainer screen another trouble saver. You can take the screen out and flush it, quick and easy. No more poking out impurities with a pen, straightened paper clip, or other makeshift method. And no damage to the screen in the process.

Built to keep on working

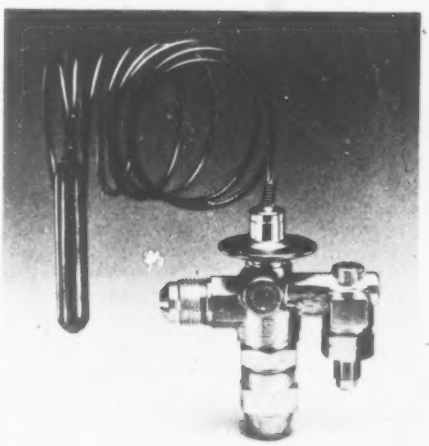
Because it's completely made of strong, corrosion resistant stainless steel, copper and brass, the A-P 223 holds up under hard knocks and acidic environments. You can confidently install it in supermarket cases, freezers, display cases and elsewhere. Each assembled valve undergoes leak tests, flow adjustments, and inspections. In fact, every valve passes through a quality audit station before packing and shipping.

A-P 223 TXV valves are stocked in 33 models by Singer wholesalers throughout the country. An all-purpose liquid cross charge handles low, medium and high-temperature applications, avoiding need to keep valves with differing charges in stock. Charges for fast response, time delay or hunt free operation are available. For precise superheat control, system and Z charges may also be specified.

Literature, presentations and more

You get quality valves from A-P. You also get a wealth of training materials. Our application and selection manuals are among the industry's best. A-P's wallet-sized temperature pressure chart is requested at a rate of 5,000 a month. And a brand new set of audio visual presentations cover every control we make.

For information on the many more virtues of the A-P 223, write us. We'll send you the name of the nearest A-P stocking wholesaler.



The A-P Line

SINGER
CONTROLS DIVISION

9655 Soreng Ave., Schiller Park, IL 60176
(312) 678-4150

Birmingham

Birmingham continues to offer a strong "trade-up" market from window units to central systems of about 3,000 to 4,000 homes a year, according to local utility saturation reports.

In the last year for which area data are available — 1979 — more than 3,700 homes made the switch from room to central systems.

The same survey shows Birmingham with about 106,000 central systems operating, of which about 7,500 are heat pumps.

New homes 2 years old or less have a 19% saturation of heat pumps; homes from 3 to 5 years old have a 13% heat pump penetration.

The number of homes with no air conditioning — either room or central — has been halved in the past decade from 40% to 20%.

New home construction, flat during 1980, is expected to remain at that level this year, according to John J. Wright, director of the local home builder's association.

"The more optimistic of us look for a turnaround in June, but the more realistic think it'll take longer than that for things to pick up. Many builders are getting into remodeling and rehabilitation work, some of it federally funded," he says.

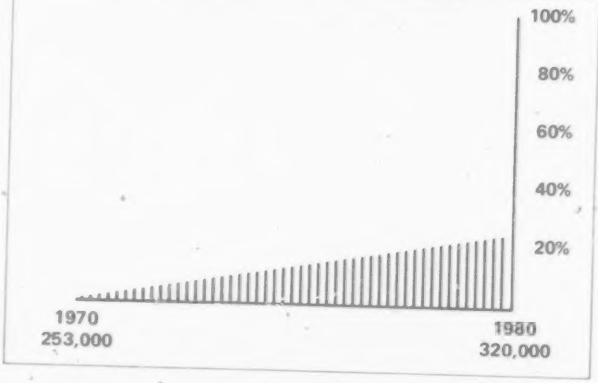
Fewer than 2,000 new single-family units were built last year. "A lot of builders would settle for that this year," he continued.

Employment cutbacks in two large local companies — U.S. Steel and Pullman Standard — have further depressed discretionary purchases in the area.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	78%	81%
Bottled or LP gas	7%	5%
Fuel oil	1%	1%
Electricity	6%	11%
Other or none	8%	2%
HEATING SYSTEM		
Warm air furnace	37%	52%
Steam or hot water	4%	1%
Built-in electric units	3%	–
Floor, wall, pipeless furnace	20%	18%
Room heaters	27%	23%
Fireplaces, stoves, portable heaters	9%	4%
None	–	2%
COOLING SYSTEM		
Central	18%	41%
Room Unit	36%	32%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	10,000
Heat pumps	6,000
Central air conditioners	17,000
Humidifiers	4,000
Vent dampers	1,000

County Housing Growth

County	1970	1980	% gain
Jefferson	212,937	253,208	19%
St. Clair	9,449	15,552	65%
Shelby	12,144	24,631	103%
Walker	19,404	27,070	40%

County Population Growth

Jefferson	644,991	650,399	1%
St. Clair	27,956	41,145	47%
Shelby	38,037	65,876	73%
Walker	56,246	68,143	21%

Dallas-Fort Worth

Dallas-Fort Worth recorded a 20% drop in new housing units in 1980 — 28,000 units compared with 35,000 in 1979.

Much of the decline was in multifamily units, which were down to 7,500 last year, a drop of 32% from the previous year.

1981 remains a question mark, according to Ed Cox, director of the Dallas Home Builders Association. "People don't know if the cost of money will go down this year — or if this is a permanent new ball game. If it is, they'll make adjustments," he says.

"But for now, a lot of mortgage applications are being turned down because incomes haven't caught up with prices yet."

Dallas grew mightily in the 1970's, adding 365,000 new housing units, a gain of 45%. Virtually all of these homes absorbed central air conditioning, of which a fair portion are heat pumps. The area annually absorbs about 10,000 heat pumps.

One of the more creative merchandisers among dealers is Alex "Ace" Stewart, who is developing a promotion to sell neighbors of existing service customers.

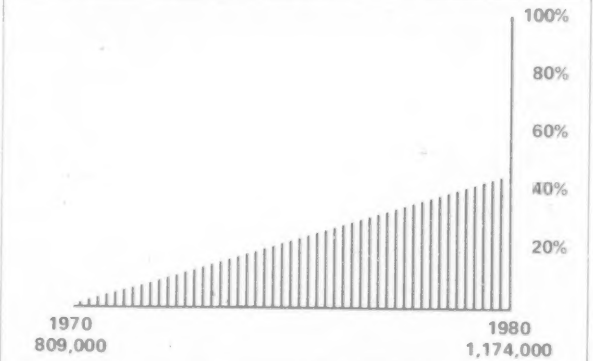
"With the price of gasoline, if you can cluster service calls in a single area, instead of driving miles to a single job, you'll be far more profitable," he says.

An address cross reference and a customer list of 3,000 names are his tools, along with a newsletter to existing customers and prospects.

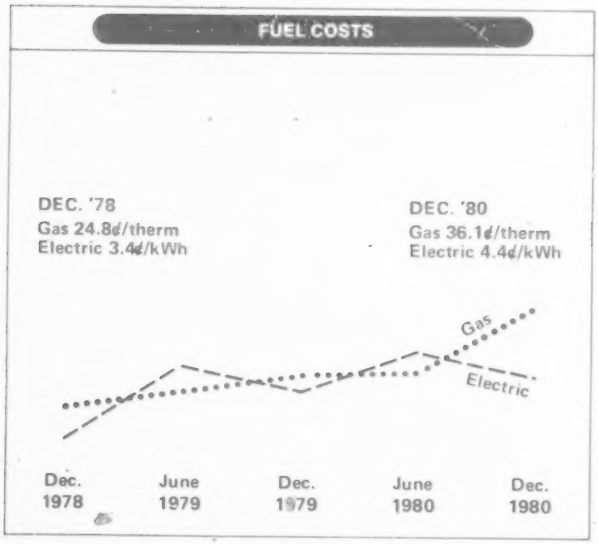
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	83%	70%
Bottled or LP gas	5%	2%
Fuel oil	–	–
Electricity	12%	28%
Other or none	–	–
HEATING SYSTEM		
Warm air furnace	53%	70%
Steam or hot water	–	–
Built-in electric units	3%	–
Floor, wall, pipeless furnace	11%	7%
Room heaters	25%	15%
Fireplaces, stoves, portable heaters	7%	6%
None	1%	2%
COOLING SYSTEM		
Central	44%	58%
Room Unit	40%	36%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	40,000
Heat pumps	10,000
Central air conditioners	80,000
Humidifiers	5,000
Vent dampers	1,000

Houston

Selling high-efficiency central air conditioners in Houston is no problem, says Ray McCann, one of the city's top dealers, who reports that 90% of his replacement sales are for units of an 8 or higher seasonal energy efficiency ratio (SEER).

"Houston is a mature market. Central home cooling started here, and we're replacing second generation systems right now," he says. "Home cooling costs have jumped from $50 a month to $150 a month in two years, and this makes it easy to sell the high-efficiency units."

New construction was down in Houston last year — off 15% for single-family and 46% for multifamily units. Builders are forecasting a 5% gain over that level for 1981.

The tail-off comes at the end of a decade that saw a net gain of nearly 500,000 new housing units in the 6-county area, an increase of 72%.

The replacement market alone involves more than 50,000 central cooling systems annually.

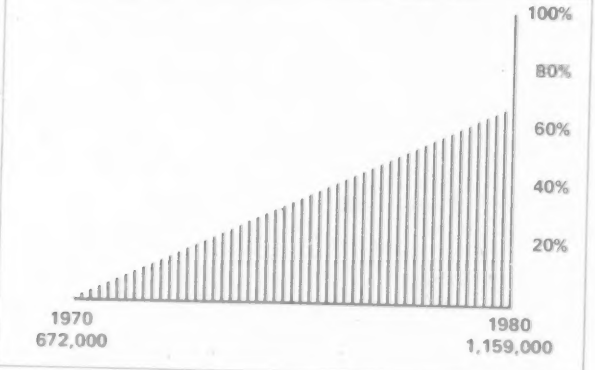
A heat pump promotion by Houston Lighting and Power Co. has been modestly successful, with particular strength in new, more expensive custom homes. However, gas as a home heating fuel remains plentiful and relatively cheap.

However, conventional air conditioning annually out-sells heat pumps by margins of 10-1 or better.

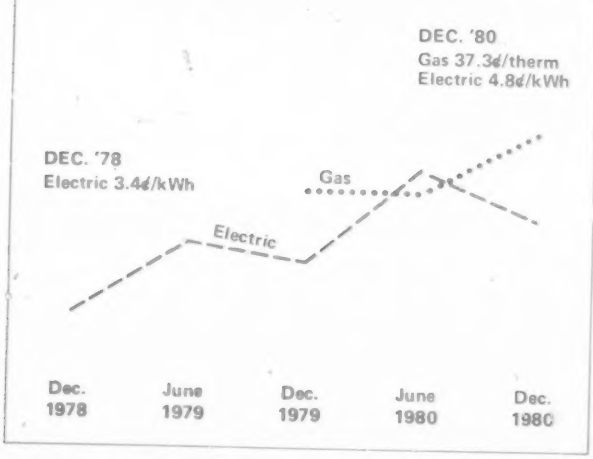
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	82%	70%
Bottled or LP gas	5%	4%
Fuel oil	—	—
Electricity	12%	25%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	48%	66%
Steam or hot water	1%	1%
Built-in electric units	4%	1%
Floor, wall, pipeless furnace	7%	7%
Room heaters	30%	17%
Fireplaces, stoves, portable heaters	10%	8%
None	—	—
COOLING SYSTEM		
Central	40%	59%
Room Unit	38%	22%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	45,000
Heat pumps	6,000
Central air conditioners	90,000
Humidifiers	5,000

Louisville

Louisville home builders, sensing the buyers' mood at a recent home show here, believe the "tip" point for interest rates is 17%. Let rates fall below that level and the pent-up demand for new homes will stimulate the market, bringing it back from the 40% dip from 1978 levels.

Tony Short, a home building association executive, contrasts buyer attitudes on energy conservation features from what they were in 1970 and 1980. "A decade ago, home buyers would balk at paying an additional $75 for extra insulation in the attic. Now, they'll pay $1,000 for a retrofit insulation job without blinking an eye."

Because of the long moratorium on new gas hookups here, the area absorbed heat pumps far out of proportion to the size of the region.

Now, virtually all new construction features the heat pump, even though the local utility, Louisville Gas and Electric Co., has attempted to ease back in with gas.

The utility reports conversions from oil to gas at about 2,500 in the past two years, but concedes that deregulation of natural gas — if it occurs — would enhance the value of electric heat pumps.

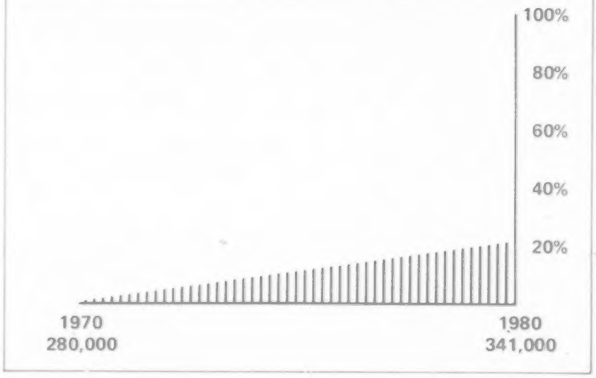
Utility executives believe the difference between electricity for heat pumps with a coefficient of performance of 1.8 is only about 17% more costly than natural gas, and that this disparity will shrink as efficiencies in heat pumps improve.

Census data show a 10-year gain of 61,000 housing units for the area, an increase of 22%.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	83%	78%
Bottled or LP gas	3%	1%
Fuel oil	8%	5%
Electricity	4%	14%
Other or none	2%	2%
HEATING SYSTEM		
Warm air furnace	67%	80%
Steam or hot water	8%	4%
Built-in electric units	2%	3%
Floor, wall, pipeless furnace	8%	5%
Room heaters	13%	7%
Fireplaces, stoves, portable heaters	2%	1%
None	–	–
COOLING SYSTEM		
Central	18%	40%
Room Unit	36%	33%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	7,000
Heat pumps	7,000
Central air conditioners	12,000
Humidifiers	4,000
Vent dampers	2,000

County Housing Growth

County	1970	1980	% gain
Bullit	7,732	13,651	77%
Jefferson	226,493	264,657	17%
Oldham (Indiana)	4,248	8,575	102%
Clark	24,088	33,055	37%
Floyd	18,294	22,776	25%

County Population Growth

Bullit	26,090	43,150	65%
Jefferson	695,055	681,471	–2%
Oldham (Indiana)	14,687	27,414	86%
Clark	75,876	88,556	17%
Floyd	55,622	61,081	10%

Memphis

Unlike many other cities, Memphis last year generated home mortgage money through the floating of two bond issues of $150 million and $50 million, respectively, a device that made available loans for homes in the $75,000 and under range.

Last year, Shelby County built about 3,000 housing units, of which 98% were single-family units. This was within 1% of the county's 1979 performance.

But now, says Jim Wahlbrink of the local home builder's association, that source of capital is not available in 1981, and local builders are predicting a flat year as new house inventories build.

"Often builders report there are four mortgage applicants for every house they build, but only one applicant among them can qualify for mortgage money," he says.

The resumption of new gas hookups after a moratorium in the late 1970's has acted as a barrier to any dramatic growth of heat pumps, which now are found in about 4% of Memphis homes. Virtually all new homes are equipped with gas forced air and straight central air conditioning systems.

Last summer's heat wave sparked the air conditioning replacement business of many wholesalers and contractors. One distributor was kept busy replacing condensing units on apartment buildings. "The heat wave accelerated the normal aging process for a lot of those systems," he says.

Memphis Light, Gas & Water reports average annual home heating bills are in the range of $230 for the 1979-1980 heating season. Natural gas is generally cheaper in the area than in other parts of the state.

"Even so, we have seen a general downsizing of heating equipment in new homes," says a utility official. "Houses are getting smaller, better insulated, and contractors can install smaller capacity, but higher efficiency units."

County Housing Growth

County	1970	1980	% gain
Shelby	222,649	286,419	29%
Tipton (Arkansas)	8,517	11,494	35%
Crittenden (Mississippi)	14,274	16,819	18%
De Soto	10,205	17,135	68%

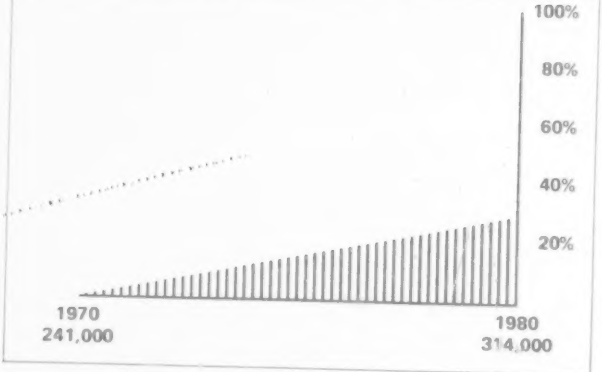
County Population Growth

Shelby	722,111	774,381	7%
Tipton (Arkansas)	28,001	32,353	15%
Crittenden (Mississippi)	48,106	49,144	2%
De Soto	35,885	53,889	50%

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	87%	83%
Bottled or LP gas	3%	1%
Fuel oil	1%	–
Electricity	10%	15%
Other or none	–	1%
HEATING SYSTEM		
Warm air furnace	42%	54%
Steam or hot water	6%	3%
Built-in electric units	5%	4%
Floor, wall, pipeless furnace	23%	23%
Room heaters	20%	15%
Fireplaces, stoves, portable heaters	3%	1%
None	1%	–
COOLING SYSTEM		
Central	23%	42%
Room Unit	48%	40%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	8,000
Heat pumps	5,000
Central air conditioners	19,000
Humidifiers	2,000
Vent dampers	1,000

Miami

Miami-area residential air conditioning systems are under the gun to justify themselves as greater residential density builds in the south Florida region.

The South Florida Regional Planning Council has developed a study which forecasts home energy use in the region will increase about 18% by 1985 over 1978 levels. At the same time, a 20% increase in housing units will have occurred in the six-year interval.

Comfort cooling will account for 45.7% of this total energy use; space heating for 7.7%.

Local planning officials are working for a 36% improvement in energy required to air condition a medium-size single-family home by 1985.

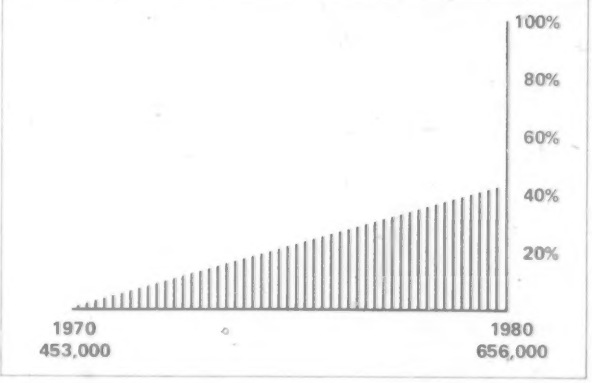
The study's conclusion is not optimistic: "Although the popularity of townhouses and more energy-efficient housing construction . . . results in significant improvements in air conditioning and space heating efficiencies, the continued increase in the installation of air conditioners in new dwellings results in only a slight decline in the average residential energy use."

Mike Braid, an energy conservation specialist with Florida Power and Light Co., believes the state's building energy code will force builders to include more energy-efficient equipment in new homes. To the extend that they are more efficient, heat pumps will increase their market share, he says, but improvements in straight air conditioning efficiencies will probably insure their continued dominance of the market.

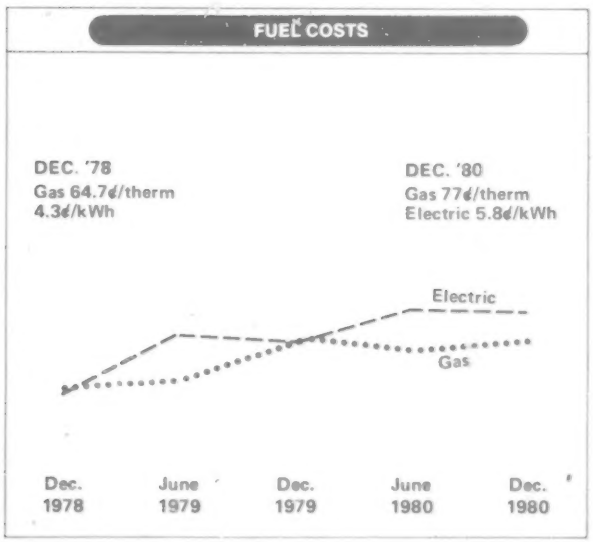
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	15%	11%
Bottled or LP gas	15%	7%
Fuel oil	7%	1%
Electricity	47%	66%
Other or none	16%	15%
HEATING SYSTEM		
Warm air furnace	20%	37%
Steam or hot water	2%	–
Built-in electric units	23%	14%
Floor, wall, pipeless furnace	3%	6%
Room heaters	18%	2%
Fireplaces, stoves, portable heaters	18%	2%
None	16%	15%
COOLING SYSTEM		
Central	18%	62%
Room Unit	52%	38%

HOUSING GROWTH



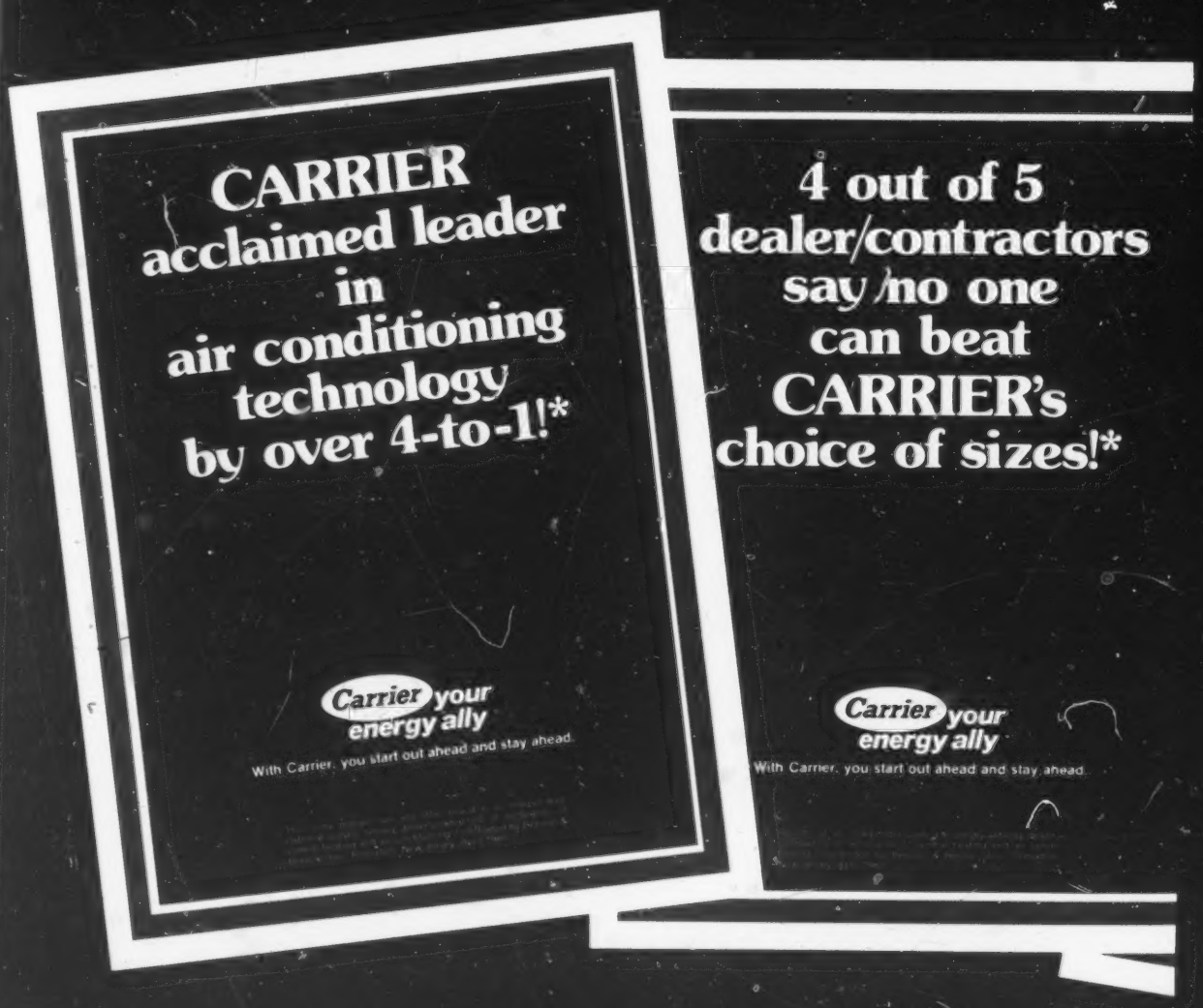
FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	2,000
Heat pumps	6,000
Central air conditioners	50,000
Humidifiers	1,000

Dealer/contractors
National sur



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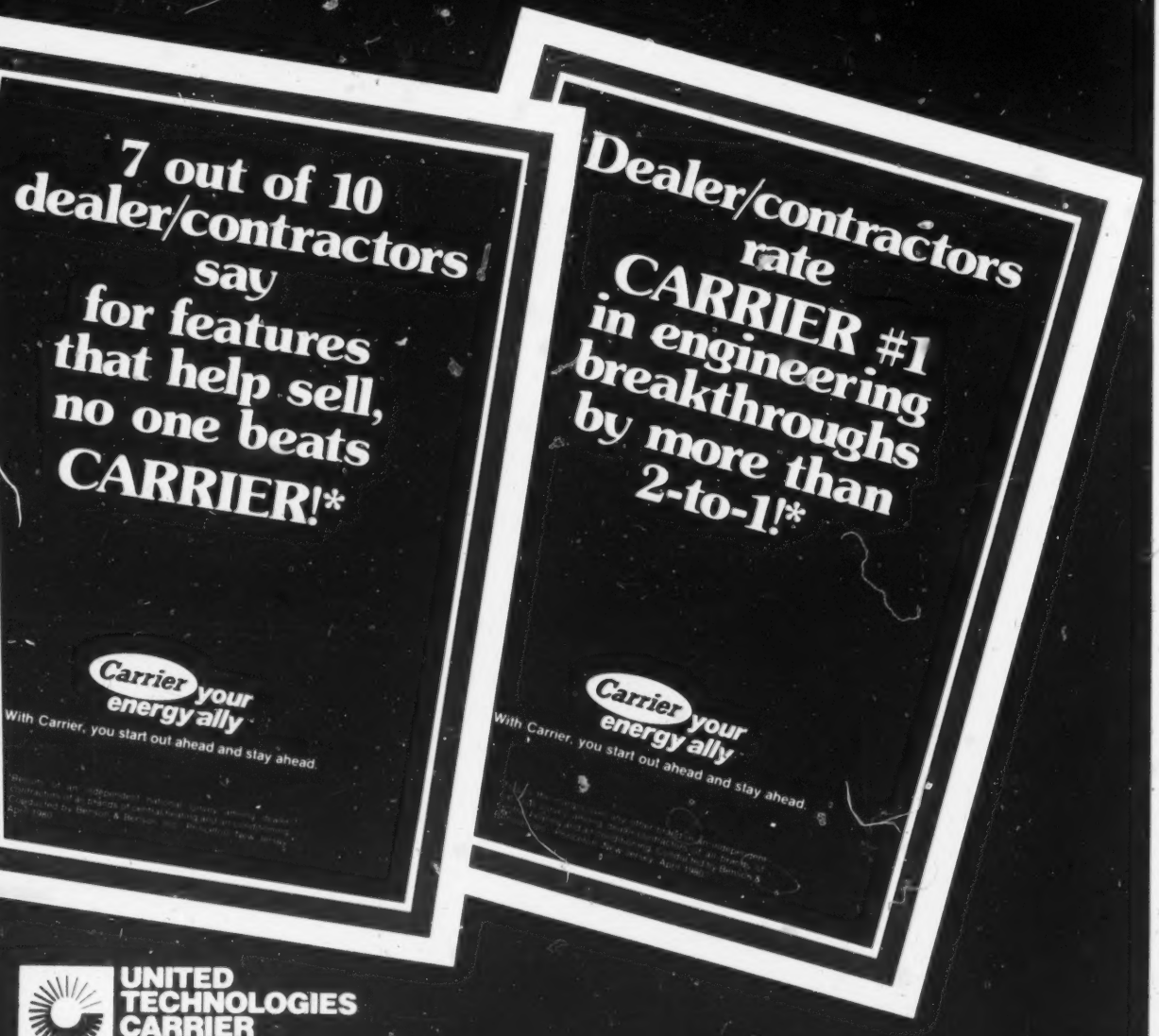


UNITED
TECHNOLOGIES
CARRIER
AIR CONDITIONING

Nashville

In January, Nashville home builders were looking at a possible 20% increase in new construction, a forecast that has since been pared back to a virtually flat year.

"Builders are treading water right now," says Keith Crowe, of the Middle Tennessee Homebuilders Association. "Contractors are taking custom jobs, remodeling, anything to pick up the slack in the new housing market."

Heat pump sales have been given a giant push by the Tennessee Valley Authority (TVA) program, whose low-interest loan program has made them an attractive buy.

Heat pumps now claim nearly one-half of the central cooling equipment shipments into the area, and they now have a saturation level of about 8% in the immediate area.

Electric rates, once among the lowest in the nation, have jumped for both residential and commercial users.

"We're mad as we can be because we have to pay 4 cents a kilowatt hour," says one equipment distributor.

Criticism of TVA, muted in past years, has grown in volume as energy costs rise.

"We're probably hurt more in this recession than we were in the recession of 1974," says Joe H. Holliday Jr., of Dale Supply Co. "It looks like we just caught up with the rest of the nation."

The 8-county area has shown a very strong growth in the past decade, from 230,000 units to 319,000 units, an increase of 39%.

County Housing Growth

County	1970	1980	% gain
Cheatham	4,223	7,463	77%
Davidson	147,266	187,137	27%
Dickson	7,563	11,091	47%
Robertson	9,859	13,265	35%
Rutherford	19,035	30,534	60%
Sumner	18,657	29,976	60%
Williamson	11,060	19,657	78%
Wilson	12,900	19,904	54%

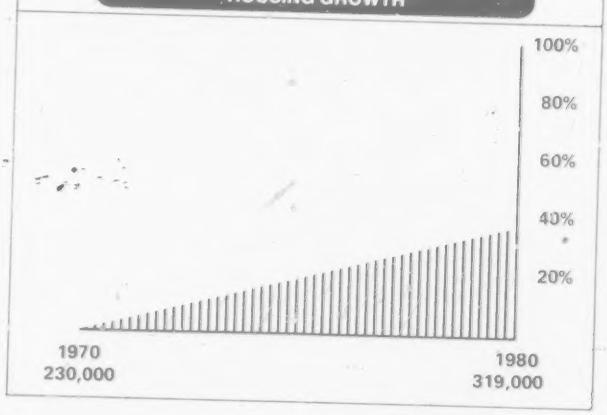
County Population Growth

Cheatham	13,199	21,560	63%
Davidson	447,877	460,268	3%
Dickson	21,977	29,974	36%
Robertson	29,102	36,128	24%
Rutherford	59,428	84,020	41%
Sumner	56,266	84,643	50%
Williamson	34,423	57,858	68%
Wilson	36,999	54,089	46%

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	30%	25%
Bottled or LP gas	4%	2%
Fuel oil	2%	2%
Electricity	56%	66%
Other or none	8%	5%
HEATING SYSTEM		
Warm air furnace	26%	35%
Steam or hot water	3%	2%
Built-in electric units	46%	48%
Floor, wall, pipeless furnace	6%	8%
Room heaters	7%	4%
Fireplaces, stoves, portable heaters	9%	2%
None	3%	1%
COOLING SYSTEM		
Central	18%	44%
Room Unit	56%	40%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	3,000
Heat pumps	9,000
Central air conditioners	15,000
Humidifiers	1,000
Vent dampers	1,000

New Orleans

The face of New Orleans will undergo a gradual change over the next decade as "New Orleans East," a huge development financed by the Murchison interests, takes shape.

Plans call for a 1982 start on 17,000 dwelling units (6,000 single-family, the balance apartments and condos) along with a commercial development.

First homes will be built by two home builders: U.S. Homes and General Homes. Much of the construction will be all-electric, with a mix of heat pumps and electric resistance heating, according to New Orleans Public Service, the local utility.

Heat pumps have not made an appreciable dent in this major air conditioning market; with 1,200 heating degree days, New Orleans gets along with resistance heating or small room heaters or furnaces.

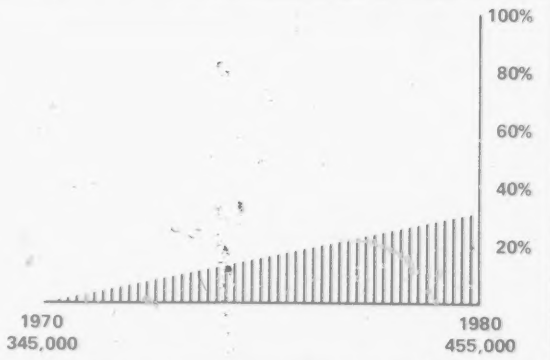
One of the largest dealers in New Orleans, Berners, Inc., thinks there will be a general housing pick-up after the first half of 1980. "High-efficiency air conditioners have won acceptance here because of our long cooling season," says Wilton Champagne of Berners.

Much of the area's growth has come from outlying counties. St. Tammany Parish grew by 92% in the decade to 41,000 housing units; St. Bernard Parish grew to 21,000 units, a 50% growth; and Jefferson Parish added 65,000 housing units, a growth of 64%.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	89%	83%
Bottled or LP gas	2%	1%
Fuel oil	–	–
Electricity	8%	16%
Other or none	1%	–
HEATING SYSTEM		
Warm air furnace	35%	47%
Steam or hot water	2%	–
Built-in electric units	3%	1%
Floor, wall, pipeless furnace	20%	19%
Room heaters	37%	30%
Fireplaces, stoves, portable heaters	3%	2%
None	–	1%
COOLING SYSTEM		
Central	24%	49%
Room Unit	42%	40%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	15,000
Heat pumps	3,000
Central air conditioners	30,000
Humidifiers	1,000

County Housing Growth

County	1970	1980	% gain
Jefferson	101,522	166,182	64%
Orleans	208,524	226,085	9%
St. Bernard	14,228	21,559	52%
St. Tammany	21,495	41,181	92%

County Population Growth

Jefferson	338,229	452,277	34%
Orleans	593,471	557,761	–6%
St. Bernard	51,185	63,700	24%
St. Tammany	63,585	109,868	72%

Orlando

"In the next three or four years, people will be scolded if they install low-efficiency air conditioners with strip heating," says Tom Miller of Coastline Distributing in Orlando.

"State code minimums for builders will open the way for high-efficiency heat pumps in a real big way here."

State utilities, pressured to achieve energy conservation goals, are looking to heat pumps as one way to meet those objectives, according to Don Meyers, of the Orlando Utilities Commission.

He points out that buyers are given a sales tax exemption on central air conditioners and heat pump units with a seasonal energy efficiency ratio (SEER) of 10.

All conservation measures are aimed at reducing the state's overall energy consumption by 25% by the year 1990, a goal established by the governor and supported by the State Legislature.

A committee now working to revise the state building code is expected to increase the minimum SEER for air conditioners from 6.8 to 7.8. An effective date would allow distributors to build up sufficient inventories.

The 3-county Orlando area continues to grow, spurred by Disneyworld and the service firms that gigantic venture has developed in its wake.

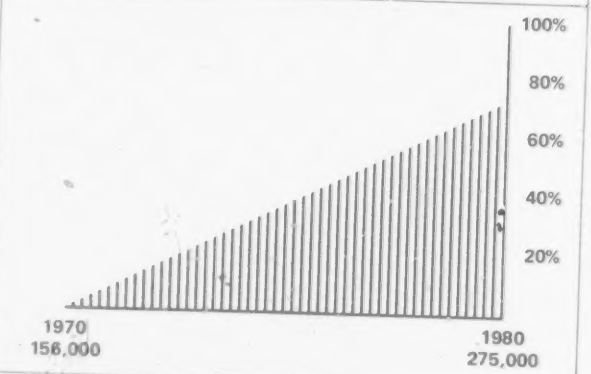
In the decade, more than 241,000 people were added to the population, a 53% growth. Housing grew apace. The housing inventory now totals 275,000 units, a jump of 76%.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	11%	14%
Bottled or LP gas	11%	10%
Fuel oil	53%	33%
Electricity	23%	43%
Other or none	2%	–
HEATING SYSTEM*		
Warm air furnace	25%	29%
Steam or hot water	2%	1%
Built-in electric units	18%	22%
Floor, wall, pipeless furnace	16%	18%
Room heaters	18%	15%
Fireplaces, stoves, portable heaters	21%	15%
None	–	–
COOLING SYSTEM		
Central	25%	56%
Room Unit	34%	30%

*NEWS estimates for 1970 and 1980.

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	4,000
Heat pumps	5,000
Central air conditioners	27,000

County Housing Growth

County	1970	1980	% gain
Orange	117,298	184,386	57%
Osceola	10,540	23,674	124%
Seminole	28,446	67,904	138%

County Population Growth

Orange	344,311	467,763	36%
Osceola	25,267	49,103	94%
Seminole	83,692	177,779	112%

Raleigh

Heat pumps have developed strongly in the Raleigh area, as well as throughout the other urban areas of North Carolina.

A 1980 report by Carolina Power & Light Co. shows a 17% saturation of heat pumps in homes, compared with 16% throughout the entire system.

Straight air conditioning is found in 42% of homes, while window units are found in 29% of them.

Interestingly, the same survey shows that 20% of Raleigh residents who have electrically heated homes also use wood as a supplementary heating system.

A strong selling point for heat pumps, says Dan Mull of the utility, is selling the units as "piggybacks" on conversion jobs from oil to gas, of which there were about 4,500 last year.

Raleigh ended 1980 with an overall 6% increase in housing construction, including about 1,300 single-family homes.

A new government definition of the Raleigh area adds Durham and Orange counties to Wake County to form a three-county Standard Metropolitan Statistical Area (SMSA).

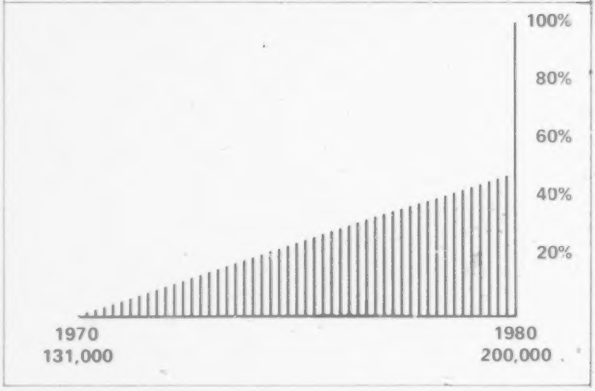
Latest Census data show a gain of about 70,000 housing units in the past decade, to the present level of 200,000.

The area also added 106,000 residents, an increase of 25% from 1970.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	29%	35%
Bottled or LP gas	4%	3%
Fuel oil	49%	30%
Electricity	14%	30%
Other or none	4%	2%
HEATING SYSTEM		
Warm air furnace	50%	69%
Steam or hot water	9%	5%
Built-in electric units	10%	7%
Floor, wall, pipeless furnace	7%	5%
Room heaters	19%	12%
Fireplaces, stoves, portable heaters	5%	2%
None	—	—
COOLING SYSTEM		
Central	22%	50%
Room Unit	48%	42%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	3,000
Heat pumps	6,000
Central air conditioners	7,000
Humidifiers	1,000
Vent dampers	1,000

County Housing Growth

County	1970	1980	% gain
Durham	43,026	58,076	35%
Orange	16,950	28,730	69%
Wake	71,520	113,258	58%

County Population Growth

Durham	132,681	150,117	13%
Orange	57,567	76,603	33%
Wake	229,006	298,339	30%

Tampa

An ambitious heat pump program developed by the Tampa Electric Co. may change substantially the profile of heating-cooling systems in the Tampa area.

The program calls for dollar rebates to air conditioning dealer-salesmen and to the homeowner for conversions to heat pumps from straight air conditioning; a parallel program offers rebates for heat pumps on new housing.

Manufacturers are planning for a 10% to 20% increase in heat pump sales this year.

The program is expected to return heat pumps to their former predominance in Tampa, where they had been enjoyed a popularity in the 1960's, and were then supplanted by straight air conditioning as a builder item because of a price edge.

Another element in the utility's energy conservation plan is the use of radio control of air conditioning and water heaters on a test basis in 1981, with possible extension beyond that if savings are realized.

A spokesman for the state's public service commission has come down hard against electric resistance strip heating, urging its discontinuance in new homes. However, the state's home builder's industry is not unanimous in its willingness to go along. A special committee is studying the problem.

Florida utility officials are concerned about electric generating capacity, especially in the face of the ever-increasing migration of new residents into the state.

Typical is Tampa's own growth in the 1970's, when it added 313,000 new homes, an increase of 72%, to its current level of 745,000 housing units.

County Housing Growth

County	1970	1980	% gain
Hillsborough	168,555	263,799	57%
Pasco	34,816	99,442	185%
Pinellas	228,771	382,099	67%

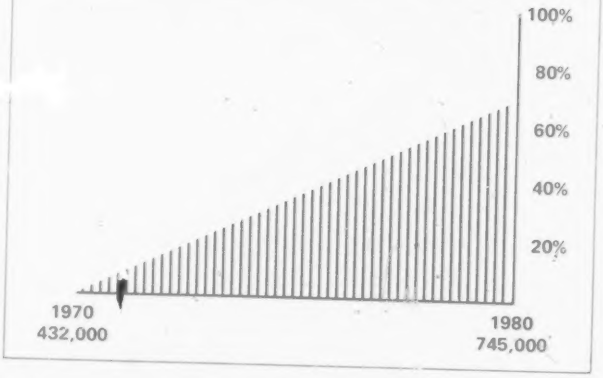
County Population Growth

Hillsborough	490,265	640,537	31%
Pasco	75,955	188,815	149%
Pinellas	522,329	720,683	38%

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	9%	12%
Bottled or LP gas	10%	6%
Fuel oil	54%	25%
Electricity	26%	56%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	27%	28%
Steam or hot water	1%	–
Built-in electric units	13%	12%
Floor, wall, pipeless furnace	15%	16%
Room heaters	21%	23%
Fireplaces, stoves, portable heaters	21%	21%
None	2%	–
COOLING SYSTEM		
Central	23%	58%
Room Unit	38%	34%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	4,000
Heat pumps	11,000
Central air conditioners	40,000
Humidifiers	1,000

Washington, D.C.

Has recession-proof Washington, D.C., finally lost its imperviousness to the national economic downturn?

Contractor Art Bennett cites a disturbing trend which surfaced last summer. For the first time in a decade, he could not count on replacing 90% of the central air conditioning systems 5 years old with completely new systems; last year, his servicemen had a 50% success rate.

Another indicator: Bennett's servicemen annually scored a 70% success rate in replacing systems on routine service calls; that success rate dropped to 55% last summer.

"And bear in mind that we operate in two of the top 10 per capita income counties in the nation — Fairfax County in Virginia, and Montgomery County in Maryland."

The area remains weather-sensitive. The kind of a year a contractor has depends on how early it gets hot. 1979 was unseasonably cool, but 1980 was much more typical of the region's hot, humid climate.

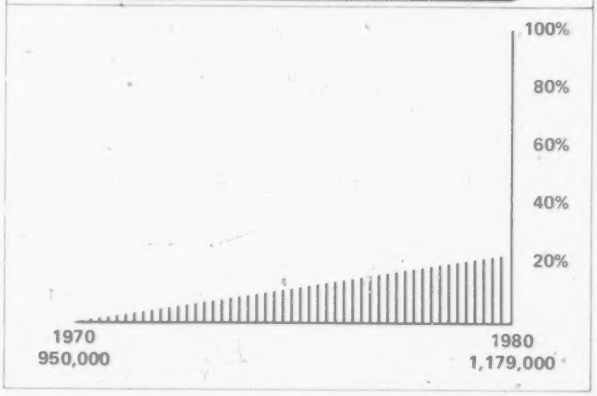
One of the biggest-volume residential contractors in the region, Barney Menditch, sees a poor year for 1981 in new home construction. "A flat year is about the best we can expect until interest rates go down, or imaginative forms of financing mortgages are accepted by the public."

Washington's housing growth was explosive in the 1970's. It added 229,000 new units to the housing stock. Conversions from oil to gas totaled more than 25,000 in the past two years.

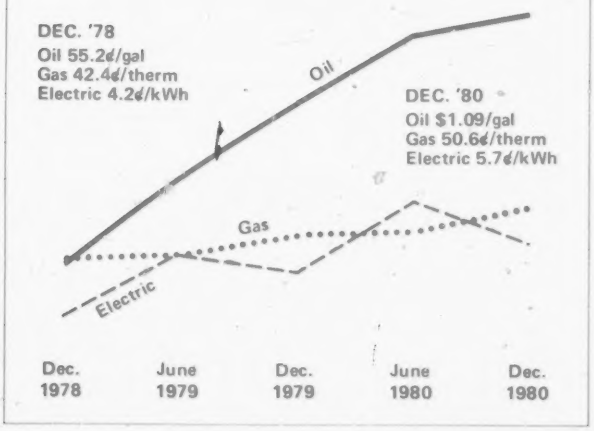
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	59%	57%
Bottled or LP gas	1%	--
Fuel oil	31%	31%
Electricity	6%	12%
Other or none	3%	–
HEATING SYSTEM		
Warm air furnace	57%	65%
Steam or hot water	34%	31%
Built-in electric units	3%	2%
Floor, wall, pipeless furnace	1%	1%
Room heaters	4%	1%
Fireplaces, stoves, portable heaters	1%	–
None	1%	–
COOLING SYSTEM		
Central	40%	62%
Room Unit	25%	25%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	12,000
Heat pumps	20,000
Central air conditioners	45,000
Humidifiers	15,000
Boilers	2,000
Vent dampers	8,000

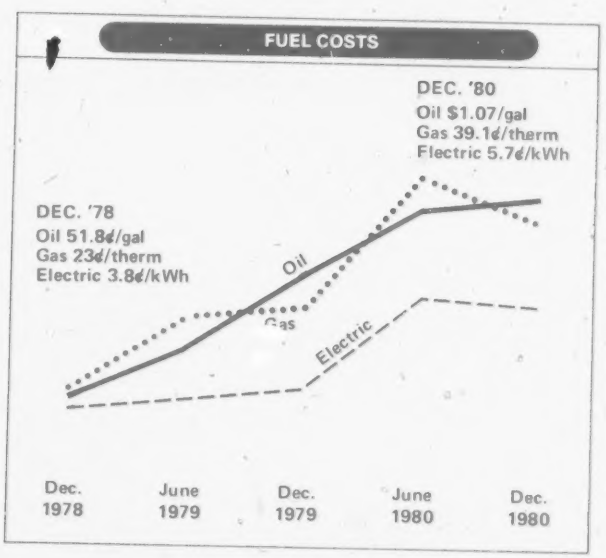
West

The West Region now accounts for about a quarter of all new single-family homes built annually in the U.S.

Its aggregate 41.7% growth in the past decade was paced by such dynamic leaps as those recorded by states like Arizona (a net gain of 527,000 units); and California (2.2 million units).

Pacific states like Washington and Oregon have acted to discourage future hookups of electric resistance heating, establishing policies that favor heat pumps. Every fifth house built in this region now has a heat pump.

California continues in the third year of its ambitious minimum appliance energy efficiency program. Future appliance growth in that state, which regularly absorbs about 10% of the nation's central air conditioning equipment, will be of high efficiency units only. Home builders are encouraged to include solar systems in new homes, although this form of energy has not yet captured an appreciable share of the market.



10-year housing units

STATE	1970 Housing Units	1980 Housing Units	% Gain
Mountain			
Arizona	585,751	1,112,095	89.9%
Colorado	757,835	1,192,522	57.4%
Idaho	244,623	374,718	53.2%
Montana	246,603	326,780	32.5%
Nevada	172,558	339,553	96.8%
New Mexico	326,128	505,700	55.1%
Utah	315,765	489,371	55.0%
Wyoming	116,323	187,804	61.5%
Pacific			
Alaska	90,827	162,359	78.8%
California	7,000,174	9,266,817	32.4%
Oregon	744,784	1,079,326	44.9%
Hawaii	216,538	334,379	54.4%
Washington	1,221,930	1,687,875	38.1%
TOTAL	**12,039,839**	**17,059,299**	**41.7%**

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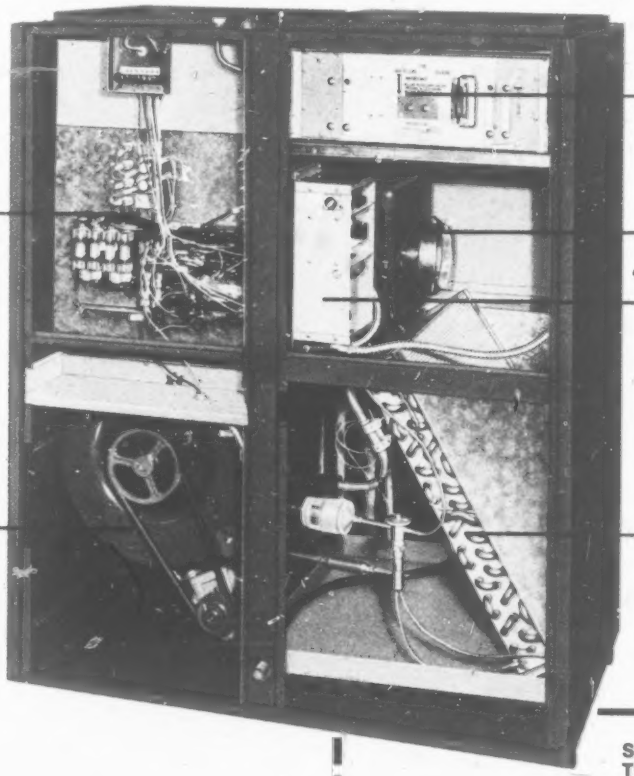

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Denver

The relatively few heat pumps now operating in Denver-area homes — fewer than 3,000 — have drawn the attention of the Public Service Co. of Colorado, which has conducted a four-year analysis of their performance.

A preliminary report cites problems with wiring and controls, along with compressor failures, refrigerant leaks, and other malfunctions.

The utility calls for "warning signals" to alert the homeowner to low refrigerant levels, reduced air flow over the coil, and potential compressor failure.

Gas forced-air systems remain the dominant residential heating system, claiming more than 90% of the market.

"Even though gas prices have doubled here, people and home builders will stand in line to get that fuel," says Al Harris, of Western Air Conditioning Distributors.

Home builders are looking for an even year in 1981, with a total unit construction of about 15,000 — of which two-thirds are expected to be single-family dwellings.

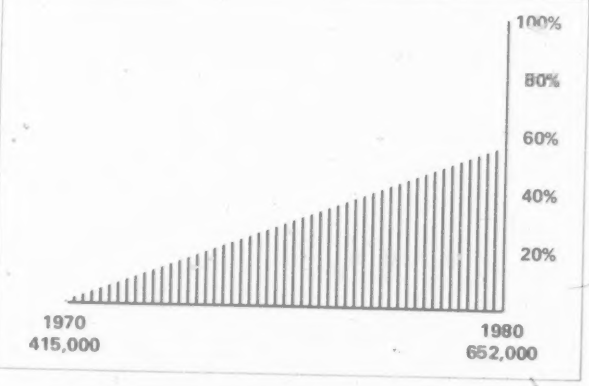
Denver's 10-year growth to 652,000 housing units — a 57% increase from 1970 — has made it among the top 20 home building markets in the U.S.

Growth has been particularly strong in Arapahoe County (65,000 new units in the decade) and Jefferson County (66,000 new units).

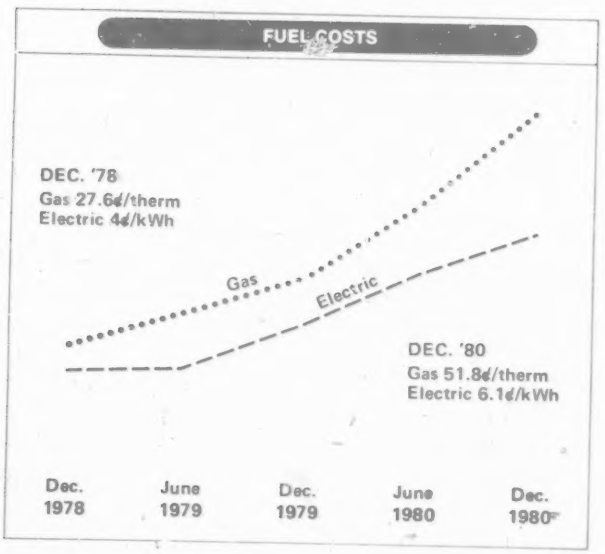
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	92%	94%
Bottled or LP gas	2%	1%
Fuel oil	1%	2%
Electricity	4%	2%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	65%	69%
Steam or hot water	21%	26%
Built-in electric units	2%	–
Floor, wall, pipeless furnace	5%	2%
Room heaters	5%	2%
Fireplaces, stoves, portable heaters	–	–
None	2%	1%
COOLING SYSTEM		
Central	5%	11%
Room Unit	12%	20%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	25,000
Heat pumps	2,000
Central air conditioners	10,000
Humidifiers	4,000
Boilers	1,000
Vent dampers	1,000

Las Vegas

A general downsizing of new homes is taking place in this still fast-growing area, forcing local equipment suppliers into fighting a very competitive battle based largely on price.

"The difference between an energy efficiency ratio (EER) of 7 and one of 8 is about 11% in price," says Frank Alexander, of Nevada Supply Co. "We don't have any EER minimums for Nevada like they do across the border in California, so it really gets down to price."

With the housing market down in 1980, many contractors are living off commercial business — office buildings, prisons, hotel additions, and convention facilities.

Utility executive Dennis Weatherington believes the main home heating-cooling system will remain the rooftop combination of gas heating and electric air conditioning.

"You'll find some swamp coolers in the cheaper tract homes, and a few pre-coolers for central air conditioning systems, but the combination units will continue to dominate the market," he says.

Las Vegas is still too new a community to provide much of a replacement market; most contractors consider replacement as offering 10% or less of their volume.

A University of Las Vegas economist, Dr. Betty Yantis, sees no decline in the influx of new people drawn to the area, although the ratio of single-family homes to multifamily units is expected to decline as mortgage money continues to be scarce.

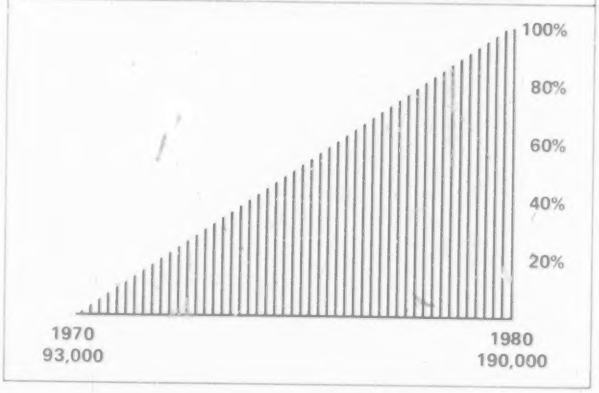
The decade saw an addition of just under 100,000 new housing units in Clark County. Within the city itself, about 23,000 new units were added.

Local housing officials estimate housing in the Las Vegas area is about 50% single family, 11% mobile home, and the balance apartments and condominiums.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	37%	44%
Bottled or LP gas	3%	1%
Fuel oil	–	–
Electricity	59%	54%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	62%	84%
Steam or hot water	–	–
Built-in electric units	20%	7%
Floor, wall, pipeless furnace	4%	2%
Room heaters	9%	3%
Fireplaces, stoves, portable heaters	5%	4%
None	–	–
COOLING SYSTEM		
Central	62%	85%
Room Unit	15%	10%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	1,000
Heat pumps	3,000
Central air conditioners	15,000
Humidifiers	500

County Housing Growth

County	1970	1980	% gain
Clark	93,047	190,220	104%

County Population Growth

Clark	273,288	462,218	69%

Los Angeles

Future sales of heating and air conditioning equipment in California will be made against the barrier of stiff appliance energy efficiency standards.

An aggressive California Energy Commission believes that the standards are cost effective for consumers, that the increased premium in the purchase price attributable to the standards is outweighed by savings in reduced energy consumption and utility bills.

Moreover, public utilities are required to meet specific energy savings quotas, either in kilowatt hours or in cubic feet of natural gas — or face a fine levied against utility shareholders.

Los Angeles has traditionally represented a lucrative market for evaporative coolers, window units and, to a lesser extent, central air conditioners.

A new survey by Southern California Edison Co. shows a system-wide saturation of 16% for central air conditioning. However, its Eastern Division shows a 34% saturation for central cooling, along with a 6% saturation of evaporative coolers. Likewise, the division shows a 5% heat pump saturation.

Gas is thought to be adequate for the region's needs, a turnaround from an earlier fear that the supply would drop sharply. Energy conservation measures by homeowners — added insulation, setback thermostats, and other activities — have reduced residential gas use by 6% since 1977.

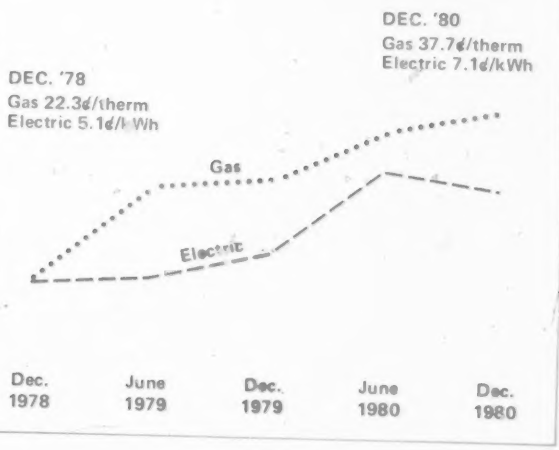
Los Angeles County added 312,000 housing units in the decade, an increase of 12%.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	90%	85%
Bottled or LP gas	–	–
Fuel oil	–	–
Electricity	8%	13%
Other or none	2%	2%
HEATING SYSTEM		
Warm air furnace	27%	27%
Steam or hot water	2%	1%
Built-in electric units	7%	1%
Floor, wall, pipeless furnace	39%	57%
Room heaters	21%	6%
Fireplaces, stoves, portable heaters	3%	2%
None	1%	6%
COOLING SYSTEM		
Central	10%	20%
Room Unit	20%	24%

HOUSING GROWTH

FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	70,000
Heat pumps	9,000
Central air conditioners	60,000
Humidifiers	5,000

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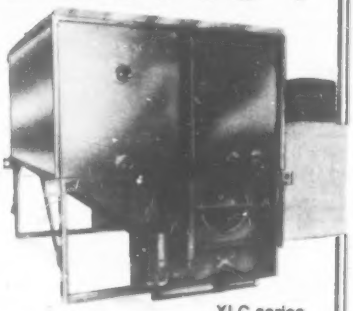

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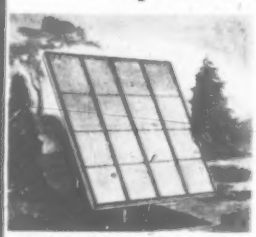

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Phoenix

Electric power rates — leapfrogging 18% in the past 12 months and expected to jump by another 10% by the end of the year — have caused a "tremendous change in consumer attitudes" on high-efficiency air conditioning equipment, according to Don Nelson, of Navajo-Air, a Phoenix distributor.

"Homeowners are starting to see $200-a-month electric bills in the summer, and this is helping develop a strong market for units with a seasonal energy efficiency ratio (SEER) in the 10-plus range," he says.

Much of the growth of Phoenix occurred during a period of relatively cheap energy; this same period saw the installation of much air conditioning equipment in the low- to medium-efficiency range.

"This replacement market is just now beginning to develop," Nelson says. "And a statewide energy tax credit program will encourage the use of timers on heat pumps, the use of heat pump water heaters, and a lot of other energy-efficient equipment. There will also be an incentive from the power company to reduce summertime peak loads."

Heat pumps now represent more than 50% of air conditioning equipment shipped into the area.

A five-year gas moratorium encouraged the growth of heat pumps, and these have proven equal to the area's grueling summer loads, which call for designs for 115°F.

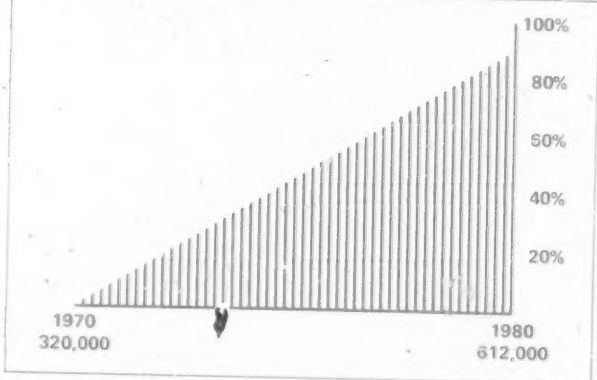
Maricopa County's addition of nearly 300,000 units in the past decade was slowed somewhat last year, when housing starts dropped to 22,000 units.

However, according to Dick Mettler of the Central Home Builders Association of Central Arizona, home builders look for a 10% increase in home construction this year, to about 24,000 units.

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	79%	65%
Bottled or LP gas	3%	1%
Fuel oil	–	–
Electricity	17%	33%
Other or none	1%	1%
HEATING SYSTEM		
Warm air furnace	64%	79%
Steam or hot water	1%	1%
Built-in electric units	5%	5%
Floor, wall, pipeless furnace	11%	6%
Room heaters	15%	6%
Fireplaces, stoves, portable heaters	3%	2%
None	1%	1%
COOLING SYSTEM		
Central	58%	69%
Room Unit	18%	10%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

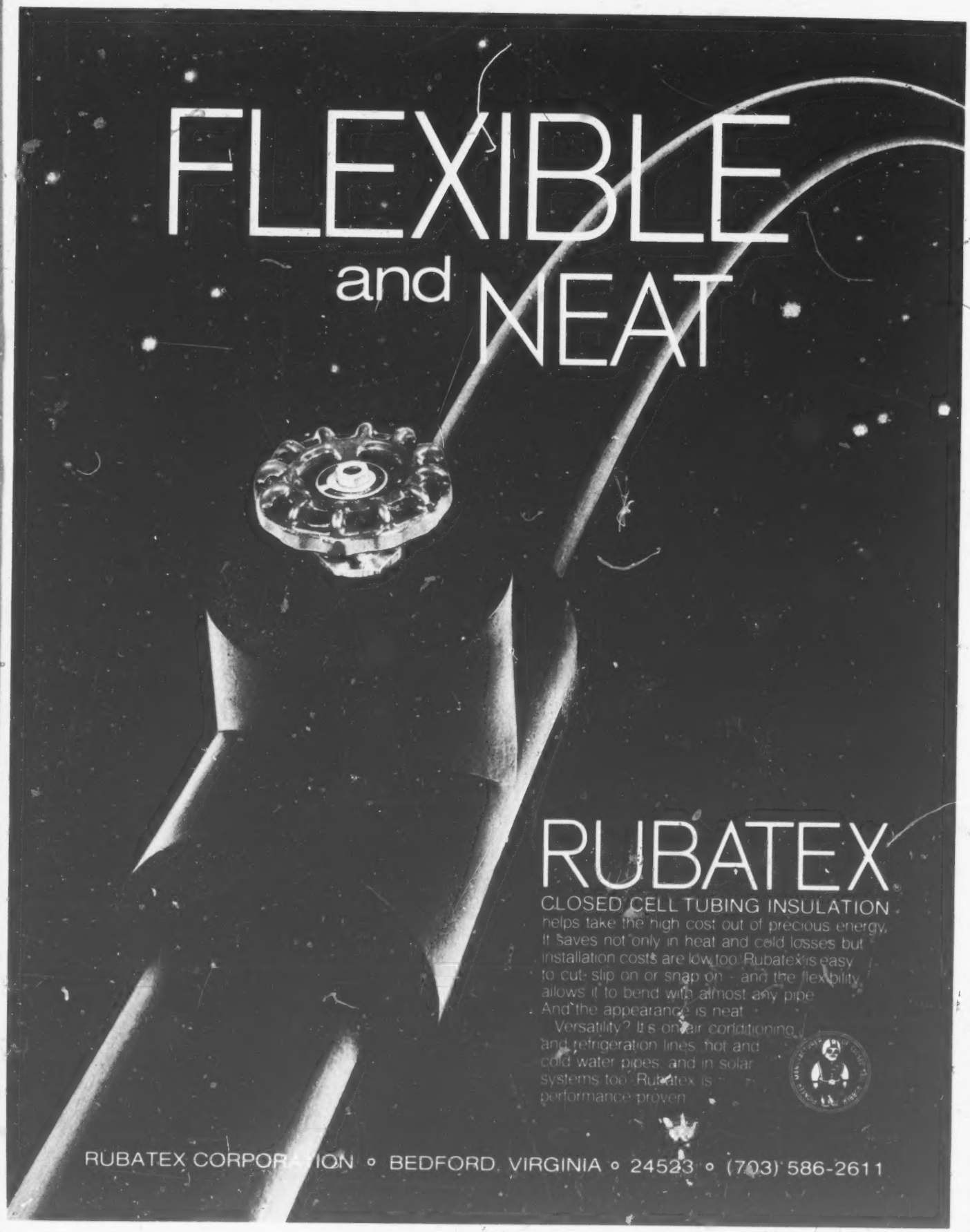
Furnaces	4,000
Heat pumps	25,000
Central air conditioners	35,000
Humidifiers	1,000

County Housing Growth

County	1970	1980	% gain
Maricopa	320,030	612,271	91%

County Population Growth

Maricopa	971,228	1,511,552	56%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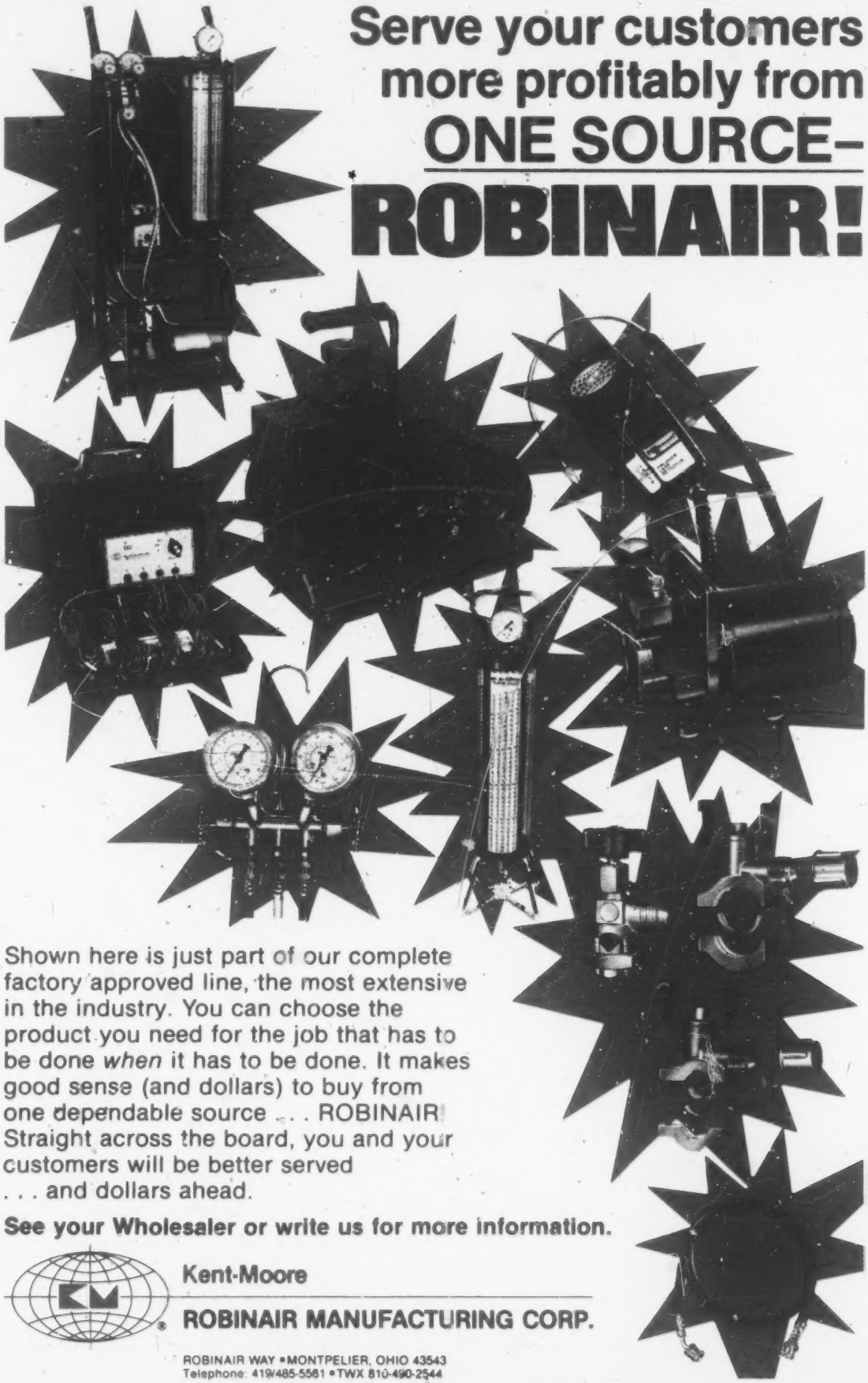

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Portland

Heat pump applications will continue their growth in this market where any new electric resistance or electric furnace heating system will involve the owner's paying a premium.

Hydroelectric capacity is being strained in the northwest and local utilities are enforcing strict insulation requirements for new electric heating hookups.

The area now absorbs about 10,000 heat pumps annually — a fair portion of them going into new housing. Home builders prefer resistance heating because ducted heat adds about $1,200 to the cost of new homes, but the state is making resistance heating less attractive.

On the other side of the fuel coin, conversions to gas totaled 6,000 in 1979, and 6,900 in 1980. About 10% of these switches involved conversion burners; the balance were new furnaces.

An alternative has been the growing use of wood-burning stoves.

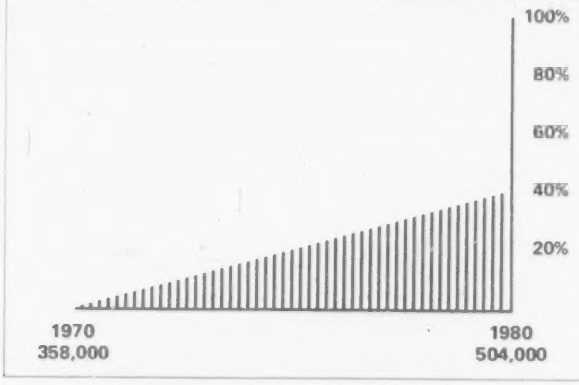
"It's enough of a problem that there are fights in the woods over timber rights, and thieves are stealing sawing logs," said one observer. "There's also a substantial pollution problem from smoke. It's illegal to burn wood outside, but not inside."

Electric rates remain among the lowest in the nation, and are now at 3.6¢ per kWh, according to the consumer price index. That's a 20% growth in two years.

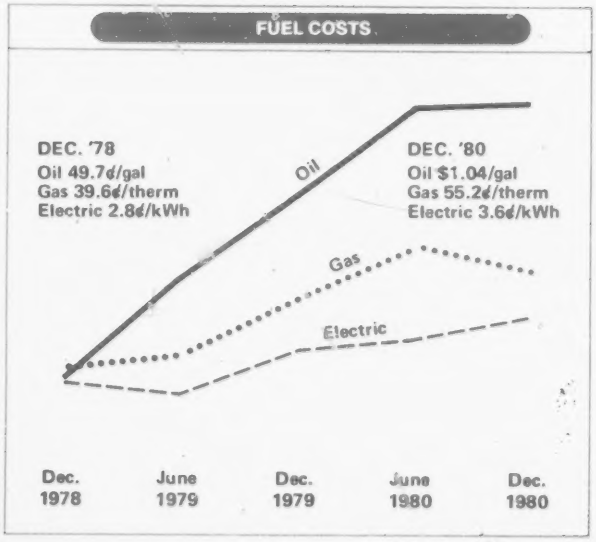
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	25%	28%
Bottled or LP gas	1%	–
Fuel oil	44%	30%
Electricity	27%	39%
Other or none	3%	3%
HEATING SYSTEM		
Warm air furnace	49%	52%
Steam or hot water	8%	7%
Built-in electric units	24%	31%
Floor, wall, pipeless furnace	4%	3%
Room heaters	11%	5%
Fireplaces, stoves, portable heaters	3%	2%
None	1%	–
COOLING SYSTEM		
Central	4%	5%
Room Unit	10%	18%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	8,000
Heat pumps	7,000
Central air conditioners	8,000
Humidifiers	2,000
Vent dampers	1,000

Salt Lake City

Home building permits have plummeted in Salt Lake County, from 10,000 in 1978, to 6,000 in 1979, to 2,000 in 1980.

"Builders have galloped along here for years, selling their houses as fast as they could build them," says Dale McLane, of the local home builder's association.

"Now, many builders are still trying to work off the inventory of unsold homes."

Home heating-cooling equipment sales have been flat, both for the builder and the replacement markets, according to Jim Giolas, of Pameco-Aire, a local distributor.

"This region has always been strong for evaporative coolers, and some homeowners with central cooling systems are installing them as a way to cut power consumption," he says. "Heat pump sales here have always had to compete in a market where gas is plentiful and cheap."

A recent report by the Utah Power & Light Co. shows saturations of 20% for central air conditioning, 30% for central evaporative cooling, and 8% for room evaporators.

Heat pump penetration is put at about 1%, and is principally a new house feature.

Recent innovations include the use of passive solar equipment as a supplement to conventional forced air systems in some builders' model homes, although this remains a specialty item.

Regional planners look to an increase of 18% in households in the 5-county area, with much of the growth coming from Salt Lake and Davis counties.

By 1990, households are expected to total 375,000, from a 1980 level of approximately 277,000 households.

County Housing Growth

County	1970	1980	% gain
Davis	24,223	41,503	71%
Salt Lake	139,593	214,531	54%
Tooele	6,455	8,553	32%
Weber	38,884	50,556	30%

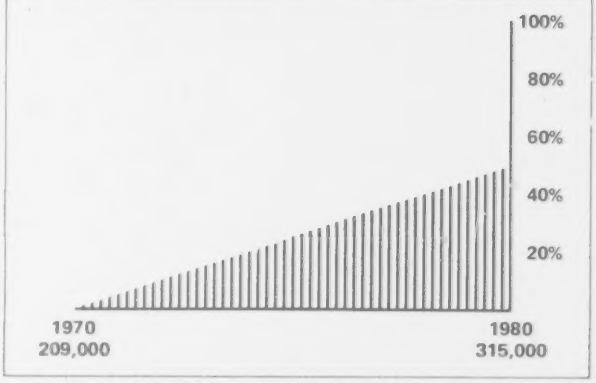
County Population Growth

Davis	99,028	146,360	47%
Salt Lake	458,607	617,966	35%
Tooele	21,545	26,012	21%
Weber	126,278	144,942	15%

SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	30%	24%
Bottled or LP gas	1%	–
Fuel oil	–	–
Electricity	66%	75%
Other or none	2%	1%
HEATING SYSTEM		
Warm air furnace	74%	80%
Steam or hot water	9%	8%
Built-in electric units	2%	3%
Floor, wall, pipeless furnace	6%	6%
Room heaters	8%	2%
Fireplaces, stoves, portable heaters	–	–
None	1%	1%
COOLING SYSTEM		
Central	16%	20%
Room Unit	18%	19%

HOUSING GROWTH



AVERAGE SHIPMENTS TO AREA

Furnaces	15,000
Heat pumps	1,000
Central air conditioners	7,000
Humidifiers	1,000
Vent dampers	1,000

San Diego

With its excellent all-year climate, San Diego has never been a prime air conditioning market in relation to its size.

Now a new dampener on central air conditioning has emerged: electric utility rates that have nearly doubled in the past two years.

Consumer price index data show a 90% increase in rates to a current level of about 9.9 cents per kWh.

The jump in rates reflects the cost of producing oil-generated electricity by San Diego Gas and Electric Co., which has launched a strong energy conservation effort.

Another disincentive: the utility, like others in the state, is under a state order to conserve a predetermined amount of energy or face a financial penalty. This enhances the utility's efforts to discourage unnecessary energy use.

Central air conditioning remains at about 10% saturation, with window units claiming about 11%. Heat pumps are found in about 1% of homes, according to utility reports, about the same level as evaporative coolers.

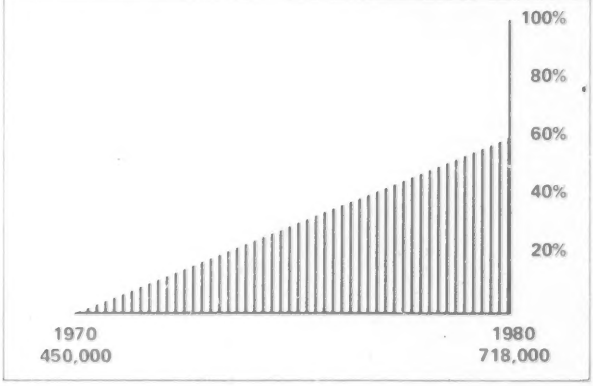
About one-fifth of the area's 718,000 housing units have electric heat. Natural gas has about 80% of the market.

Future growth of air conditioning here will come largely from replacement rather than new volume.

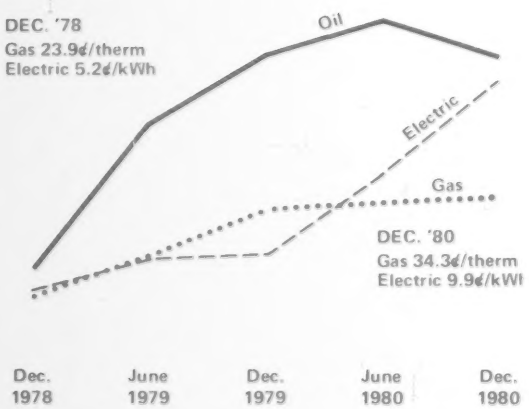
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	84%	79%
Bottled or LP gas	3%	2%
Fuel oil	–	–
Electricity	11%	16%
Other or none	2%	3%
HEATING SYSTEM		
	35%	42%
Warm air furnace	1%	–
Steam or hot water	8%	13%
Built-in electric units	32%	38%
Floor, wall, pipeless furnace	19%	3%
Room heaters	4%	3%
Fireplaces, stoves, portable heaters	1%	1%
None		
COOLING SYSTEM		
Central	4%	10%
Room Unit	10%	18%

HOUSING GROWTH

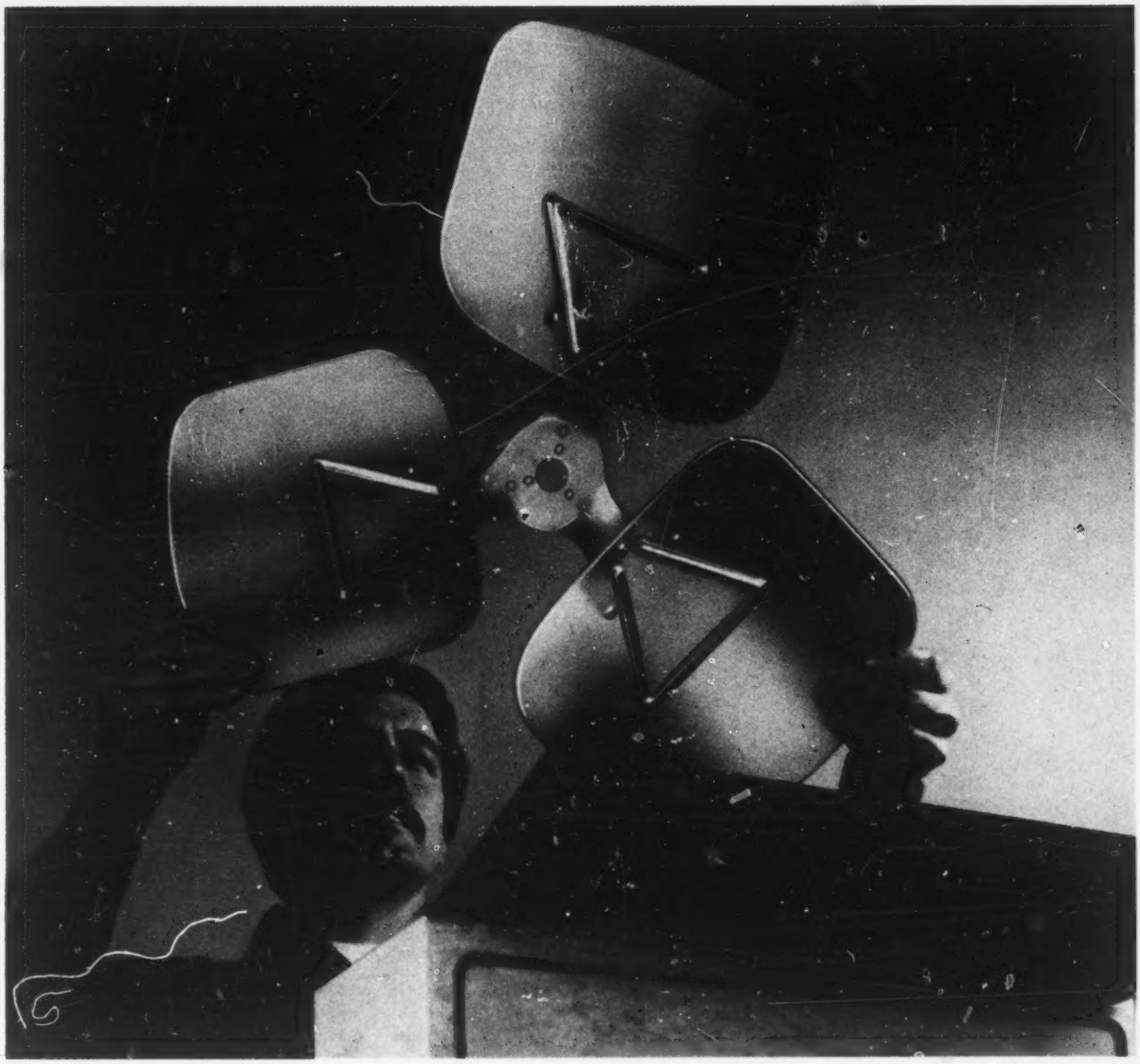


FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	17,000
Heat pumps	4,000
Central air conditioners	15,000
Humidifiers	1,000



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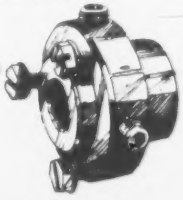


UNITED TECHNOLOGIES ESSEX CONTROLS

San Francisco

The heat pump — hero or villain in northern California?

Pacific Gas and Electric Co. points out that the recent increase in electric heat pumps — now put at about 4% of homes built since 1975 — may inadvertently increase the summer electric load. Homes that might have refrained from turning on a separate cooling system may find it easier to keep the system running throughout the cooling cycle.

Like other utilities in the state, Pacific Gas and Electric must comply with a stated energy savings goal or face financial consequences.

In the immediate Bay area, central air conditioning saturation is very low, while outlying cities like Sacramento (39% saturation) and Stockton (36% saturation) reflect the far different climate split in northern California.

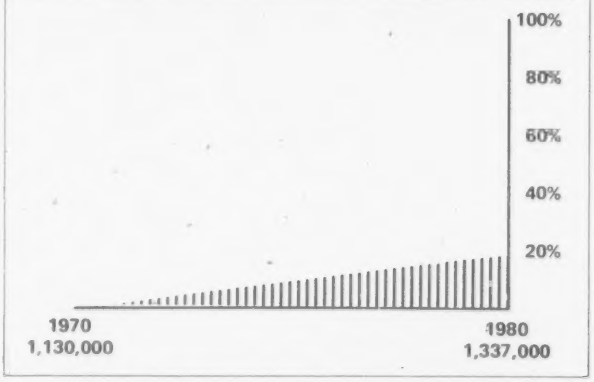
The California Public Utility Commission has divided the region into three space-cooling zones, two of which are given "life-line" residential electric rates in the summer. In all, about 400,000 homes in the utility's service area have central cooling and enjoy this summer rate.

San Francisco's 10-year housing growth was 207,000 units, an 18% increase generated largely outside the central cities of San Francisco and Oakland, whose combined 10-year growth in housing was fewer than 10,000 units.

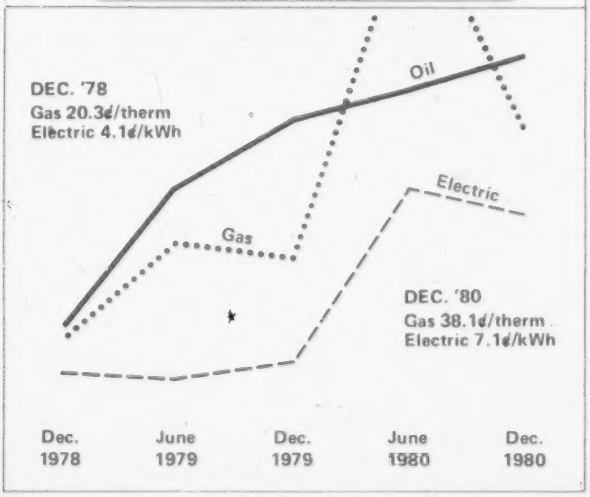
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	89%	90%
Bottled or LP gas	1%	–
Fuel oil	–	1%
Electricity	8%	7%
Other or none	2%	2%
HEATING SYSTEM		
Warm air furnace	39%	51%
Steam or hot water	10%	10%
Built-in electric units	5%	6%
Floor, wall, pipeless furnace	20%	33%
Room heaters	13%	9%
Fireplaces, stoves, portable heaters	2%	1%
None	–	–
COOLING SYSTEM		
Central	2%	5%
Room Unit	7%	9%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	40,000
Heat pumps	4,000
Central air conditioners	6,000
Humidifiers	1,000

Seattle

"We are adding people, but we are not adding power," according to a local utility executive, who called for mandatory curtailments on future electric power use.

Utilities will be forced into more capital-intensive generating facilities, and the impact on electric rates — now about the lowest in the country — will be traumatic for an area that has developed largely on cheap energy.

Consumer price index data show electric rates at 1.9¢ per kWh. Residential cooling remains at a very low saturation; typical monthly summer electric bills for homes with central air conditioning do not exceed $20 in most cases.

Puget Sound Power & Light Co. estimates that 84% of new homes built in its 9-county service area come equipped with electric heat.

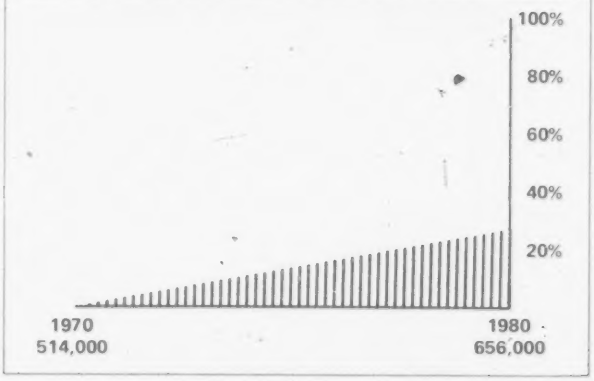
The Washington Natural Gas Co., a merchandising utility, reported 5,665 conversions from oil and electric to gas last year in its 5-county service area. The switches had this impact on equipment: the utility sold 2,642 furnaces and 157 conversion burners; and leased (at $3.95 per month) 2,886 conversion burners.

Despite the impending energy pinch, the area grew by 27% in the past decade. Housing units in the area grew by 142,000 in the past decade — a growth that may be severely restricted in the 1980's.

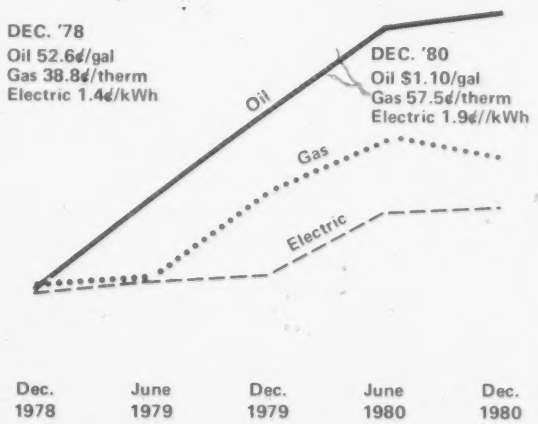
SATURATION PATTERNS

FUEL USE	1970	1980
Utility gas	26%	31%
Bottled or LP gas	1%	–
Fuel oil	43%	32%
Electricity	28%	35%
Other or none	2%	2%
HEATING SYSTEM		
Warm air furnace	47%	53%
Steam or hot water	11%	9%
Built-in electric units	26%	29%
Floor, wall, pipeless furnace	4%	3%
Room heaters	9%	4%
Fireplaces, stoves, portable heaters	2%	2%
None	1%	–
COOLING SYSTEM		
Central	2%	3%
Room Unit	3%	3%

HOUSING GROWTH



FUEL COSTS



AVERAGE SHIPMENTS TO AREA

Furnaces	10,000
Heat pumps	3,000
Central air conditioners	3,000
Humidifiers	2,000
Vent dampers	1,000

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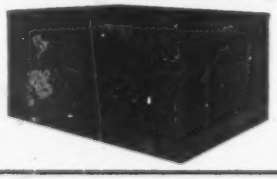

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Comfort in construction . . .

(Continued from Page 31)

tics of new homes completed last year would not be available until September. That's still the case if you want to get the official Bureau of the Census report.

But because of an exclusive arrangement between The News and the bureau, we are able to report now (see accompanying table in this section) on housing comfort system characteristics a full six months ahead of the official publication date.

National statistics, too, have an annoying habit of clouding what's really happening in import regions and in local markets. With this in mind, The News has again included elsewhere in Statistical Panorama a breakdown of the residential markets of 40 cities and four principal regions. Included for the first time are the prices for the principal fuels in 25 of those cities and how they have changed over the past two years.

Looking at what's happened in 1980, we find that the south accounted for 47.5% of all single-family homes and 44.4% of all multifamily homes completed last year. This compares with 41.2% of single-family and 39.6% of multifamily homes completed in 1979.

The south's additional share of single-family home construction came mostly from the north central region, which slipped from 22.5% to 17.7% last year, and partly from the west, which dropped from 26% to 24.5%. The northeast remained stable at an already depressed 10.5%. In the multifamily market, the south gained and all other regions declined slightly.

The penetration of air conditioning in single-family homes in 1980 was 62.6%, up slightly from 60.3% in 1979. Penetration of air conditioning into multifamily units also increased slightly from 83.7% in 1979 to 84.4% last year.

The increase in air conditioning penetration was due in large measure to the increased share of total new housing by the south, where 84.5% of single-family and 95.5% of multifamily housing was air conditioned last year. For the south, however, this represents a 1% drop in single-family and a 3% drop in multifamily penetration rates.

Perhaps the most surprising is the continuing strength of the heat pump in the face of wide-open competition from natural gas. Heat pumps were installed in 332,000 single-family homes built in 1979, or 25.5% of all one-family housing and half of those that were electrically heated. In 1980, heat pumps were installed in 232,000 single-family homes, almost entirely because of the lower number of starts. The heat pumps still accounted for 24.3% of the total and almost half of those with electric heating systems.

Natural gas was used to heat 41.2% of all new single-family homes last year, up slightly from 39.4% in 1979. Electricity stayed even and oil, a victim of soaring prices, dropped from 6.5% in 1979 to only 3% last year.

For comparison, the last detailed census of the nation's housing stock in 1970 showed: gas 52%; oil 24%; electricity 7%; LP gas 6%; and other 11%.

Although the number of single-family homes that do not use gas, electricity, or oil for heat only grew from 3.63% of the total (47,000 homes) to 5.3% of the total (51,000 homes) from 1979 to 1980, the differences in the northeast and north central states were dramatic.

In the northeast, the 6,000 homes (or 4.4% of the region's total) with "other" systems in 1979 grew to 10,000 homes (4.5% of the total) last year. Similarly, the 13,000 north central homes (4.5% of the region's total) built with "other" systems swelled to 17,000 homes in 1980 (or 10% of that region's total).

Because "other" is not defined and could include LP gas, solar, coal, and wood, we would have to guess that most of the "other" systems are wood and LP gas. Multifamily homes, on the other hand, stick almost wholly to the three standard fuels. In the south last year it would appear that 21,000 homes used space heaters for warmth compared with 8,000 of these homes in 1979.

In terms of systems, those with no central system (6.5%) and those with warm air furnaces (56.6%) grew a bit last year and single-family homes equipped with heat pumps (24.3%), hydronic systems (9%), and electric baseboard or radiant systems (6.5%) dropped marginally.

The improved housing characteristics will enable marketers to keep a closer eye on the relationship between heat pumps, electric furnaces, and electric resistance baseboard/radiant systems.

Because electricity was used to heat 50.5% (or 482,000) single-family homes, and because the breakdown shows that 24.3% of all single-family homes (or 232,000 homes) used heat pumps and another 9% (or 86,000 homes) used resistance baseboard/radiant systems, it can be said with some confidence that about 164,000 electric furnaces went into single-family homes in 1980.

Keeping in mind that housing completions dropped 26% last year, we find that electric furnace applications in single-family homes dropped 20% and that heat pumps and baseboard/radiant systems dropped by 30%.

Because the figures for multifamily units are not so detailed, the estimates are not as reliable. The News estimates that 30% (108,000) of the multifamily units using electric heat last year used heat pumps, that 27% (97,500 units) used electric furnaces, and that 43% (155,000 units) used electric baseboard/radiant systems.

Taken together, we estimate that about 340,000 heat pumps, 260,000 electric furnaces, and 240,000 electric baseboard/radiant systems went into new housing in 1980.

Fuel costs

Using figures supplied by the U.S. Department of Labor's consumer price index program we find that, from June, 1978, to December, 1980, the cost of all home energy — including home fuels, gasoline, and motor oil — for U.S. urban consumers increased by 67.9%.

The biggest increase (78.4%) over the 2.5-year span was experienced by mid-sized cities in the northeast and the smallest increase (56.5%) came to small cities in the south and west.

Total household fuel cost (oil, coal, LP, natural gas, and electricty) increased by 45.9% over the 2.5-year period. The biggest contributor was fuel oil, which increased by 108%.

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Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and the earlier published data. Where sources give significantly varying information, that data is mentioned.

Heating-cooling-fuel new home characteristics

(Based on three quarters revised, one quarter preliminary Census Bureau figures. All numbers are rounded.)

	1979					1980				
	U.S. total	Northeast	North Central	South	West	U.S. total	Northeast	North Central	South	West
Single-family homes completed	1,299,000	135,000 10.4%	292,000 22.5%	535,000 41.2%	338,000 26%	954,000	100,000 10.5%	169,000 17.7%	453,000 47.5%	234,000 24.5%
Space heating fuel										
Gas	512,000 39.4%	32,000 23.7%	161,000 55.1%	147,000 27.5%	172,000 50.9%	393,000 41.2%	35,000 35%	99,000 58.6%	136,000 30%	122,000 52%
Electricity	663,000 51%	47,000 34.8%	97,000 33.2%	364,000 68%	154,000 45.6%	482,000 50.5%	37,000 37%	46,000 27.2%	303,000 66.9%	97,000 41.5%
Oil	85,000 6.5%	49,000 36.3%	21,000 7.2%	14,000 2.6%	— —	29,000 3%	18,000 18%	6,000 3.5%	6,000 1.3%	—
Other/none	47,000 3.62%	6,000 4.4%	13,000 4.5%	16,000 3%	14,000 4.1%	51,000 5.3%	10,000 10%	17,000 10%	10,000 2.2%	14,000 6%
Heating systems type										
Warm air furnace	728,000 56%	39,000 28.9%	199,000 68.1%	277,000 51.8%	211,000 62.4%	540,000 56.6%	33,000 33%	116,000 68.6%	246,000 54.3%	147,000 62.8%
Heat pump	332,000 25.5%	14,000 10.4%	46,000 15.8%	204,000 38.1%	67,000 19.8%	232,000 24.3%	10,000 10%	20,000 11.8%	153,000 33.8%	46,000 19.7%
Hydronic	62,000 4.8%	43,000 31.8%	14,000 4.8%	2,000 0.4%	3,000 0.9%	36,000 3.8%	23,000 23%	8,000 4.7%	1,000 0.02%	2,000 0.8%
Electric baseboard/ panel/radiant	127,000 9.8%	31,000 23%	26,000 8.9%	28,000 5.2%	43,000 12.7%	86,000 9%	24,000 24%	14,000 8.3%	25,000 5.5%	23,000 9.8%
Other/none	51,000 3.9%	6,000 4.4%	8,000 2.7%	23,000 4.3%	14,000 4.1%	62,000 6.5%	9,000 9%	8,000 4.7%	31,000 6.8%	14,000 6%
With central air conditioning	783,000 60.3%	46,000 34%	136,000 46.6%	457,000 85.4%	156,000 46.2%	597,000 62.6%	29,000 29%	76,000 45%	383,000 84.5%	109,000 46.6%
Multifamily homes completed	570,000	53,000 9.3%	121,000 21.2%	226,000 39.6%	170,000 29.8%	545,000	46,000 8.4%	103,000 18.9%	242,000 44.4%	153,000 28%
Space heating fuel										
Gas	151,000 26.5%	11,000 20.8%	50,000 41.3%	23,000 10.2%	69,000 40.6%	164,000 30%	16,000 34.8%	46,000 44.7%	35,000 14.5%	66,000 43.1%
Electricity	386,000 67.7%	22,000 41.5%	70,000 57.9%	200,000 88.5%	98,000 57.6%	361,000 66.2%	20,000 43.5%	57,000 55.3%	204,000 84.3%	81,000 53%
Oil	22,000 3.86%	17,000 32%	1,000 0.8%	3,000 1.3%	1,000 0.6%	14,000 2.6%	10,000 21.7%	—	2,000 0.8%	—
Other/none	6,000 1%	— —	— —	1,000 0.4%	3,000 1.8%	6,000 1.1%	—	1,000 0.9%	—	6,000 3.9%
With air conditioning	477,000 83.7%	43,000 81%	100,000 82.6%	223,000 98.7%	112,000 65.9%	460,000 84.4%	35,000 76%	88,000 85.4%	231,000 95.5%	106,000 69.3%

Comfort in construction . . .

(Continued from Page 104)

Natural gas increased by only 46.2% nationally but some areas such as Denver, Colo., at 119%, San Francisco, Calif., at 89.8%, Los Angeles, Calif., at 77%, and Houston, Texas, at 71%, experienced sharp increases.

Electricity increased only 25.2% nationally over the 2.5-year period. The sharpest increases came in San Diego, Calif. (86.6%), Denver, Colo. (69%), Boston, Mass. (65%), and Honolulu, Hawaii (61%). Rates in Baltimore, Md., actually dropped 14%. Residents of Anchorage, Alaska, escaped with a 3.1% increase in natural gas prices and a 14.8% increase in electric rates over the 2.5-year period.

Going into 1981, U.S. householders were paying an average of $1.066/gal for fuel oil. This, however, does not include the 20 cents/gal added in the first quarter of 1981. They were paying an average of 42.2 cents/therm for natural gas, although in some northeast cities it was 75 cents/therm more than that. In Honolulu, householders were paying $1.837/therm for LP gas for cooking and domestic hot water heating.

Also going into 1981, householders were paying an average of 6.2 cents/kWh for electricity although there were extremes such as 12.1 cents/kWh in the New York City area, 9.9 cents/kWh in San Diego, Calif., 8.4 cents/kWh in Honolulu, and 8 cents/kWh in Boston. In fact the whole northeast averages 8.5 cents/kWh.

Conversions

The uneven escalation of fuel prices, together with the availability of natural gas in 1978 after severe curtailments dating back to 1971 and beyond, has brought about a booming conversion market. Conversions to oil from other fuels, which amounted to 50,000 for many years, amounted to only 10,000 last year, down from 12,000 the year before.

Electric heat has never fared well in the conversion market because it is priced highest in the northeast where the conversion market is most active. But electric heat is more secure from the blandishments of other fuels, too, because fossil fuel-fired systems usually require a chimney that is not available in nearly all electrically heated homes.

The star in the conversion market is natural gas and most of the victims have been oil-fired systems, first in the northeast and then in the east north central and mid-Atlantic regions. The number of gas conversions has surged dramatically from 89,000 in 1977 to 143,000 in 1978 and 365,000 in 1979. Last year the American Gas Association (AGA) estimated 383,000 gas conversions were made.

The conversion marathon, which should continue in 1981 at the same pace, has caused severe shortages in gas conversion burners and a meteoric rise in gas boiler shipments. Both the burner shortage and the steep climb in gas boiler shipments will ease considerably this year, however.

Regulations

In terms of government regulations affecting indoor comfort, 1980 was a mixed up year. Labels ordered by the Federal Trade Commission were placed on a wide range of residential heating-cooling equipment and major home appliances last year but, in the case of central heating and cooling equipment, fact sheets were added. The labels and fact sheets tell consumers the seasonal efficiency of the unit and the efficiency range for that particular size.

Mandatory energy efficiency minimums, which were to have been set by the end of 1979 and in place by mid-year 1980, have been put in limbo by the Reagan Administration while it is determined if they are needed at all. Although there are exceptions on both sides, the home appliance industry generally wants the minimums scrapped while the comfort equipment manufacturers tend to favor a single federal standard to a myriad of state standards.

The emergency building temperature rules, which were introduced by President Carter and forbid temperatures in most buildings to exceed 68°F in winter or go below 78°F in summer, were scrapped by President Reagan. The controversial building energy performance standard (BEPS) was placed in limbo early in 1980.

The biggest threat on the horizon at the moment is the proposed restrictions on fluorocarbon refrigerant use by the Environmental Protection Agency in response to the theory that fluorocarbons harm the earth's ozone layer. Chances are good that legislation calling for EPA to halt regulations until the theory is proven or disproven will be passed in 1981.

Conservation

As can be seen elsewhere in this issue, Americans for at least three years now have been paying much more than lip service to energy conservation. Insulation values have been rising steadily and energy efficiency has become an essential, not just desirable, feature of new homes.

One study estimates that energy savings in the U.S., despite the fact that most are unplanned from a national policy standpoint, now amount to the equivalent of between four and five million barrels of oil a day — or more than 10% of the energy used in the peak year of 1973. Certainly, after allowing for economic growth and other factors, the figures contained elsewhere in this issue would appear to bear out the statement.

Aside from overall increases in equipment efficiencies, it has given rise to some new products such as vent dampers and revitalized others such as insulating glass and setback thermostats.

According to the Sealed Insulating Glass Manufacturers Association, penetration of their product in new homes built last year was 66% and will rise to 77% by 1985. Similarly, nonresidential use of sealed insulating glass is expected to increase from 40% in 1980 to 46% in 1985. New England, the north central and middle Atlantic states all had reported penetration rates above 90% in 1980, SIGMA reported.

A special survey conducted by the Bureau of the Census in 1977 as part of its Annual Housing Survey suggested a 12.2% saturation level for setback clock thermostats in the 75.2 million homes in existence that year. The total number of clock thermostats was estimated at 9.1 million.

Interestingly enough, the penetration rate — nearly 16% — was almost identical in the 42.8 million owner-occupied homes with thermostats and the 15.9 million renter-occupied homes with thermostats.

On a regional basis, the east south central (22.2%), south Atlantic (19.3%), and middle Atlantic (18%) areas had the highest saturation levels while the west north central (6.9%) and mountain (7.7%) regions had the lowest saturations.

An interesting sidelight was contained in a Fortune magazine interview in which Honeywell was asked

(Page 108, Please)

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"We, too, have confidence in our fine people. And from that trust comes pride in our products and healthy optimism in the strong future of our company.

"We like having your confidence. And we intend to keep it."

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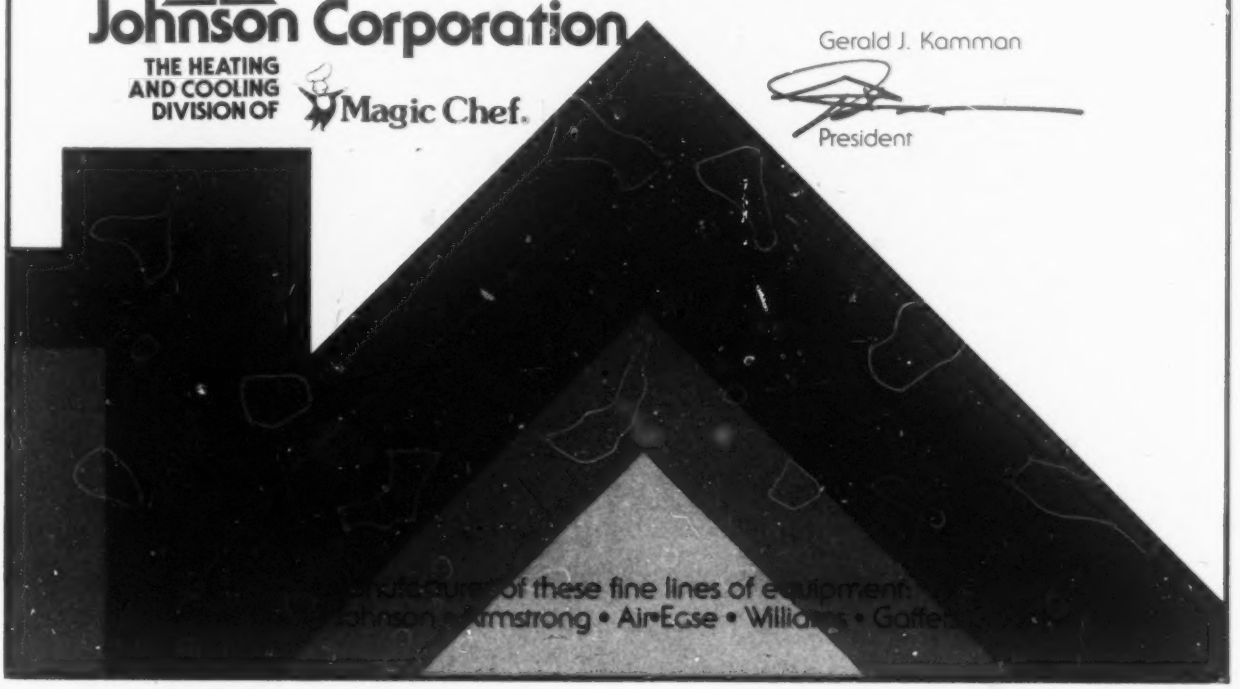
THE HEATING AND COOLING DIVISION OF Magic Chef.

Gerald J. Kamman

President



...of these fine lines of equipment:
...Johnson • Armstrong • Air-Ease • Williams • Gaffers...

Comfort in construction . . .

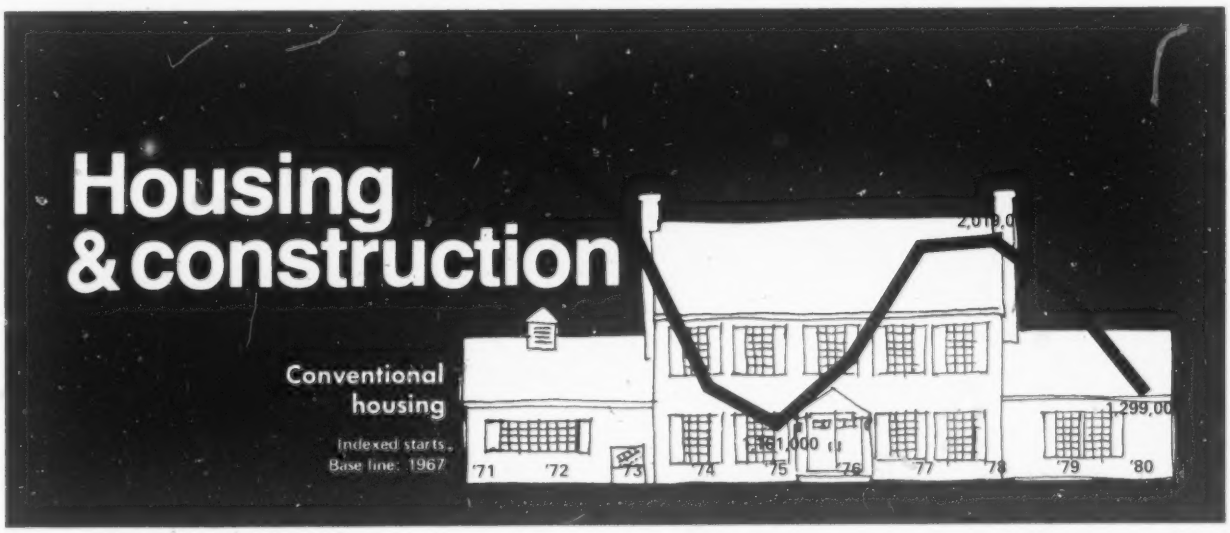
(Continued from Page 106)

how many setback thermostats it was making. Honeywell, as might have been expected, refused a direct answer — but did say that it was producing as many in two weeks of 1980 as it produced in all of 1973.

The sale of vent dampers has blossomed since they were granted approvals by AGA and Underwriters' Laboratories. Some estimate that aftermarket sales in 1980 probably topped half a million units, about 90% of them the thermal type which do not require electrical connections. Add to this a like number of OEM-installed vent dampers, most of which are the electrical type.

At the same time, replacement sales are illustrating an almost overwhelming response to higher efficiency products. One oil heating authority offered that as many as three quarters of the 400,000 oil-burner replacements last year were not because the original equipment was faulty. They came because homeowners, suffering from high fuel bills, wanted the best efficiency they could get.

One point, however, continues to stand out. Despite escalating energy prices, Americans still want to be comfortable. They may set back temperatures when not at home but, when they are at home, they want to be warm in winter and cool in summer just as much as they ever did. And they appear to be ready to pay for efficiency rather than go without.



Helped by creative financing and an ever-increasing demand, the private new-home construction market managed to scrape through 1980 with only a 26% drop in starts despite interest rates that would have been thought unconscionable only two or three years ago.

The decline does not reflect a lack of demand — which the National Association of Home Builders (NAHB) estimates at 2.3 million starts a year for the next decade. In fact, NAHB puts it this way:

"With all indications pointing toward 1981 as a year of very slow economic growth, with housing and automobiles taking the brunt of the plans to fight inflation, it does not take an economic genius to see that one of the greatest housing crises this nation has ever known may be in the making."

The culprit has been the Federal Reserve Board which, in an attempt to contain the money supply and limit inflation, has resorted to drastic economic shock treatments three times in less than 18 months — moves that have pushed interest rates through the roof and made future planning all but impossible. President Reagan's economic package, even if substantially approved by Congress, would have little effect on construction until 1982.

Private housing starts declined by 26% in 1980 to 1,292,000 from the 1,745,100 starts recorded in the previous year. It followed a 14% drop in 1979 and almost reached the near disastrous level of 1,160,400 private starts in 1975.

Most of the decline, a 28.6% drop, was in the single-family home market. After dropping by 240,000 units in 1979, single-family home starts slid an additional 340,000 units from 1,194,100 units in 1979 to 854,100 units last year.

Multifamily starts, which had declined by only 6% in 1979, dropped by 20% last year from 551,000 units in 1979 to 439,900 units last year.

1981 forecast

Looking ahead, any prediction must take into consideration the extreme downward pressure exerted by mortgage rates of 15% or more and the prospect that chances are slim they will drop more than two or three percentage points throughout the year. Only two years ago, half of the states had usury laws prohibiting long-term loans paying more than 10% interest.

Changing attitudes on the part of the public, together with a continuing belief of many that real estate

(Page 110, Please)

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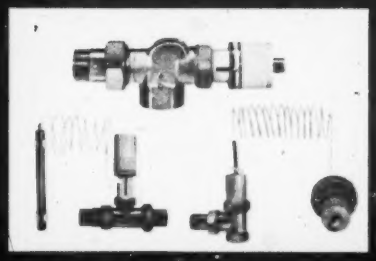
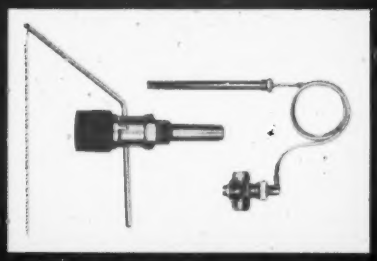


Non-electric thermostatic control valves for heating

Self-contained and self-powered, these modulating valves control hot water or steam flow to maintain accurate room temperature and cut fuel consumption by up to 35%.

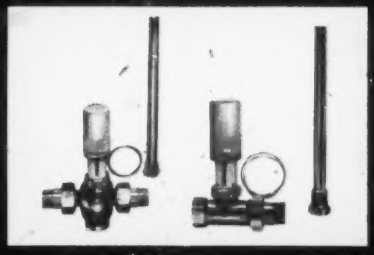
Six control types mount interchangeably to companion line of angle and straight valve bodies, sweat or threaded connections, ½" - 1" sizes. Easily installed without wiring or electricity. Can be locked, limited or encased in a protective control guard to prevent tampering.



Non-electric thermostatic controls for solid fuel boilers

C-20 draft regulator. Self-contained and self-powered, it thermostatically senses boiler water temperature and modulates air flow to fire chamber. Adjustable range 104° - 212° F. ½" NPT, brass or nickel plated.

3063 thermal safety valve. Self-contained and self-powered, it prevents excess temperatures in solid fuel boilers by controlling water flow through the domestic hot water coil or separate heat sink. ½" response temperature 212° - 215° F.

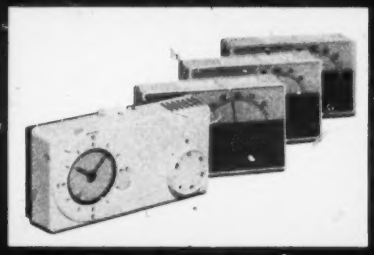


Non-electric thermostatic control valves for commercial and industrial applications

Self-contained, self-powered valves for cold water, hot water or steam. ½" - ¾" - 1" sizes for condensers, heat exchangers, tempering valves, process work, oil preheaters, water storage heaters, solar systems.

Type 6250. A reverse acting valve that opens on temperature rise. Range 47° - 197° F.

Type 6251. A direct acting valve that closes on temperature rise. Range 104° - 212° F.

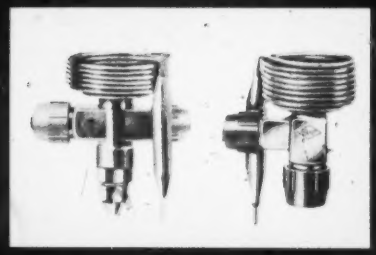


7-day and 24-hour clock thermostats for heating

7-day. Programs different night and day temperature setback periods for each day of week. Ideal for professional and commercial offices. Multi-zone applications available.

24-hour. Provides up to 3 setback periods every 24 hours. Ideal for residential use.

Both have 3-position switch for automatic setback, permanent setback or normal operation. Totally enclosed synchronized clock. Range 32° - 86° F adjustable setback 0° - 15° F. Measures only 2.8" x 5.5" x 1.5".



Expansion valves for refrigeration and automotive air conditioning

Refrigeration types: TER-1 through TER-A-8 for R-12, R-22, R-502. Capacities are from ½ to 16 tons. Adjustable superheat, pressure limiting, internal or external equalization.

Automotive types: TEC-2 through TEC-4. Capacities are from 2 to 4 tons. Fixed superheat, pressure limiting, internal or external equalization.

All components are non-corroding. Stainless steel orifice, head and diaphragm. Full brass body. Rupture pressure 100 atm, testing pressure 28 atm.

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Housing and construction--

(Continued from Page 108)

still is one of the best hedges in an inflationary economy, provide the confidence to predict private housing starts will reach 1.4 million units in 1981. That's an 8% increase over last year's performance.

Single-family starts will increase only about 5.5% to 900,000 units while multifamily units, which held up better through 1980 and early this year, will increase by 13.5% to 500,000 units. In terms of demand, those figures represent a miserable performance; but against this year's economic backdrop it represents something of a miracle.

For many years the housing industry has complained bitterly about its use by government to either stimulate or, more often, to brake the economy. It tended to interfere with the forces at work in a free market and, often, resulted in real hardship for the home building industry and its principle suppliers.

It is perhaps significant that, so far at least, President Reagan's program of budget and tax cuts does not address itself to housing directly. The thought is that, once the economy gets moving again, housing will get its share of the action along with other industries.

If that prediction holds true, and Congress passes the package without major change, relief for the housing industry will not come this year. The earliest relief can come from the federal budget program is in 1982, and, even if it comes, housing will have to scramble for capital (mortgage money) in competition with all other industries.

Action by the Federal Reserve Board is not so predictable. Chairman Volcker and his advisers, we feel, seriously overreacted in October, 1979, and twice since that time in panic moves to drive up the discount rate (at which banks borrow money from the federal reserve system) in order to also drive up the prime rate to restrict borrowing and control expansion of the money supply. The only optimism stems from the hope that Volcker will temper any additional panic moves this year with a seeming desire not to unduly antagonize the new administration in Washington.

Late in 1980 and early this year there were indications that housing starts in the south, which in the past few years have accounted for 40% to 48% of all home building activity, are starting to weaken. The decline so far has been modest but it does prove there are limits even to this boom phenomenon.

Fifteen years ago the northeast accounted for as much as 22% of total housing production, and even 10 years ago the region produced 16% of the nation's new homes. NAHB feels that the northeast's share this year will be at an alltime low of 8.8%.

Similarly, the north central states have been hit hard by high interest costs and migration to the south. In 1978 a total of 450,000 new homes, or 22.3% of the national total, were started in this region. Starts in the region declined 56% last year from 1978 levels — the drop was 61% for single-family units — to 15.4% of the national total. NAHB predicts a 14% increase in 1981 for the north central states, but if it materializes, it will still be only half of the 1978 level.

Two regions — the south and west — now account for about 75% of all housing production compared with 60% two decades ago. All of the gain, however, has come in the south. This factor, together with the high proportion of higher-priced homes, explains the increasing penetration of central air conditioning systems.

The top 10 housing production areas, in order, are: Dallas-Fort Worth, Texas; West Palm Beach-Boca Raton, Fla.; Houston, Texas; Miami, Fla.; Los Angeles-Long Beach, Calif.; Phoenix, Ariz.; San Diego, Calif.; Fort Lauderdale-Hollywood, Fla.; Atlanta, Ga.; and Washington, D.C.

Only four of the top 20 markets are in the north central and northeast regions: Minneapolis-St. Paul, Minn. (16); Philadelphia, Pa. (17); Chicago, Ill. (19); and Detroit, Mich. (20).

Pressure continues

The housing declines of the past two years are not a result of weakening market pressure. Vacancy rates among rental apartments were running at 4.8% in the fourth quarter of 1980 compared to 5.2% a year earlier, and apartment shortages are common in many cities, including the northeast and midwest.

In 1980 there were 18 million people in the 25- to 35-year-old age group, the prime home-buying category, compared to 10.5 million in 1970. An estimated 41 million people will reach age 30 in the 1980's — or 1.1 million more each year than reached age 30 in the 1970's.

Despite this growing demand, however, three major factors affect the volume of home building today and in the immediate future: the price of new and existing homes has escalated much faster than family income; national financial policy has driven up interest rates beyond the ability of most buyers to qualify for mortgages; and the availability of money for mortgages in the future will be limited by stiff competition from other industries, from business, and from government.

The median price of a new home, for example, escalated 147% between 1969 and 1979, from $25,600 to $62,900. In the same period median existing home prices rose from $21,800 to $55,600, or 155%, but median family income increased by only 103% from $9,433 annually to $19,684. At the end of 1980 the median price of a new home was $64,600 and of an existing home was $63,000.

Disregarding taxes and insurance, monthly payments on a $60,000 mortgage at 16% are $807 and require an annual income of $38,736. That same mortgage at 12% would cost $617.17 a month and require an income of $29,624. But at 9% interest, the monthly payments would be $482.78 and the income needed to qualify would be $23,173. It is doubtful, however, that mortgages below 13% will be available before 1982, if then. In January, the average rate for a conventional 30-year mortgage was 15.4%.

According to the Chicago Title Insurance Co., median monthly mortgage payments, including taxes and insurance, increased 33% from $449 monthly in 1979 to $599 in 1980 while median household income rose 17% from $25,390 to $29,670. Average home buyers were spending nearly a third of their income for home payments; first-time buyers were spending 35.5% of their income for basic housing costs.

Some builders use the "effective after-tax interest rate" to ease the impact of high interest rates on high-income buyers. For example, a $100,000 mortgage at 16% for a couple earning $50,000 a year would show an effective rate of 7.19% after federal and state taxes.

Too, singles are emerging as an important buyer class. In 1979 singles, living alone or sharing expenses

with others, accounted for 25% of all households and purchased one in every 11 homes sold. By the end of the decade, a third of all households will be made up of singles. And of the married households, which is expected to shrink to a 56% share by the end of the decade, more than half will have both husband and wife working.

Real estate consultant Robert C. Lesser says today's buyer is not a shelter-seeker willing to compromise. "He's buying for investment, tax shelter, appreciation, and also to have a home that reflects his life style and tells who he is. Most have lived in modern housing and want this standard or better in the condominiums and town houses they buy."

Money markets

During the post-World War II period, investment in residential properties averaged about 37% of gross industry investment in plants and equipment. In 1977 and 1978, the residential share rose to 49% and, in 1979, it dropped to 45%. In future, however, it will be forced to compete against stiff competition from industry, particularly if President Reagan's industrial investment incentives take hold.

In the past, savings and loan associations and mutual savings banks have supplied as much as 55% of the money for conventional mortgages. However, the net inflow into these thrift institutions, at $517 billion in 1980, was down 29% when compared to 1979 — and by 75% when compared with 1978.

Also in the past, most mortgages were financed by savings. Today, however, 40% of savings and loan mortgages come from repayments on existing mortgages, 19% comes from interest on savings, 15% comes from the sale of mortgages to others, and only 12% comes from net new savings.

In order to move new and existing homes, builders and owners have come up with a wide range of mortgage and creative financing plans. There are variable rate mortgates, 3-year renegotiable mortgages, graduated payment mortgages, pledged-account mortgages (in which an added amount is withdrawn from an extra fund included in the down payment), and reverse annuity mortgages (which provide monthly payments withdrawn against equity and added to the mortgage).

If it weren't for seller financing (through land contracts, loan assumptions, second mortgages), lender participation loans, and creative financing techniques, there would be a depression rather than a recession in the home building industry, according to the Realtors National Marketing Insitute. Creative techniques other than a first mortgage, usually at 1% to 3% below the conventional mortgage rate, accounted for about 35% of existing home sales last year.

Many builders, in order to qualify more potential buyers, are offering a land lease option under which the buyer purchases the house and leases the land, thus reducing the total price by about 10%. Buyers can purchase the land later at a price agreed to at the time of the original sale or later sell the house on the same sale-lease basis.

Many of the builders of larger, custom homes have moved down the scale in 1980 and 1981 to build much smaller — and less expensive — models. They reason that, in today's troubled market, these units sell better and do not require quite so much up-front capital.

The share of FHA mortgages, too, has moved upward slightly since the upper limit was raised. FHA now finances 97% of the first $25,000 and 95% of the remainder up to a top of $67,500. The Federal Home Loan Mortgage Corp. (Freddie Mae) and Federal National Mortgage Association (Fannie Mae) also have increased their maximum mortgage limits to $98,500 for single-family homes to $189,000 for 4-unit properties.

Multifamily

The multifamily housing market topped the 1 million mark in 1972 but, four years later, stood at 375,000 units. Last year's performance, at 439,900 units, represented a 20% drop from the 551,000 units started in 1979.

The market has not been overbuilt since 1966. Vacancy rates in rental units, which had dropped through the floor in most cities only a year ago, can be deceptive. The reason stems from economic conditions rather than any quirk in the apartment market.

The pattern of young people electing to share housing or to move back with their parents because of inflation has provided a safety valve for the tightening rental market. Apartment vacancy rates increased twofold in some cities in 1980, although the base at the time was only 2% or 3%.

Reasons for the shortage of rental units have not changed in seven years. High interest rates, a tax law that makes rental units unattractive to speculators, and the spread between average rental rates and the cost of building new units, will continue to keep new developments out of all but the tightest markets. Rent controls in many cities also have had a dampening effect.

Although there are no figures available, conversions of rental apartments into condominiums is a phenomenon that will continue for several years. These conversions, estimated at 145,000 units in 1979, probably slowed to less than 100,000 units last year because of the high interest rates.

Demand for new multifamily condominium units continues strong, particularly in the sun belt states, and should continue to account for about 25% of multifamily starts.

Looking ahead to 1981, we expect multifamily starts to increase by 14% to 500,000 units. Because these developments take more time to get underway, the increase is a reflection of the few months last year when 12% and 13% money was available. Too, foreign investment, particularly in southern markets, should continue to provide a small boost to this market.

Mobile homes

Shipments of mobile homes, which have been popular alternatives for retired people and those with moderate incomes, decreased by 20% in 1980 to 221,500 units. The comparable 1979 figure was 277,400.

About 40% of these homes have central air conditioning. Although 70% are single-wides, which have grown to 14 ft by 75 ft in many cases, another 30% have widths up to four times that of their single-wide counterparts. The wide units are brought to the site, bolted together, and their wheels are removed.

The public housing market, despite repeated government promises, continues relatively steady at about 200,000 units a year. In 1980 the 125,900 HUD public housing units and 70,100 subsidized units represented a 14% decline from the 153,600 HUD and 74,700 subsidized units started in the previous year.

Looking down the road, the National Association of Home Builders' forecast sees 1.67 million homes being started in 1982. The level of home building will again top 2 million units in 1983, they feel, and reach 2.2 million units in 1984. Regional shares will remain much as they are today.

1981 in perspective--

(Continued from Page 18)

Construction values

Construction contracting volume in 1980 totaled $147 billion, according to Dodge/Sweet's Construction Outlook, about 12% less than the $165.5 billion expected this year.

Inflation, however, can make these figures misleading. It is perhaps more meaningful, in terms of unit shipments of this industry's goods, to look at construction market activity in terms of constant 1972 dollars and in millions of square feet of floor space.

Using Construction Reports issued by the Bureau of the Census (for values in constant 1972 dollars) and Dodge/Sweet (for millions of square feet), a different picture emerges.

Census figures for 11 months of 1980 compared to the same period a year earlier show that **private nonresidential construction** declined, in real terms, by 1.2% last year. The Dodge/Sweet outlook for 1981 is for an increase of 1% in dollars but a decline of 8% in total floor area.

Office building construction, which doubled between 1976 and 1978, increased by 23% last year in real terms when compared to 1979 values. This high level of activity is expected to decline by about 3% in dollars and by about 12% in real terms (from 244 million ft² to 215 million ft²) in 1981. Chiller bookings, however, indicate another growth year for this category, which is obtaining much of its financing at below market rates from foreign sources.

The construction of **other commercial facilities** last year declined by 2.4% in real terms when compared to 1979. The outlook for this year is for an increase of 2% in dollars but a decline of 9% in floor area (from 441 million ft² to 400 million ft²). Most of the decline will come in light commercial construction, which softened considerably in the last half of 1980.

Industrial construction dropped by nearly 17% last year and is expected to drop somewhat less (4% in dollars, 11% in square feet) in 1981. Promised tax incentives together with generally cramped manufacturing facilities promise a major expansion in this area; however, starting in the last quarter of this year.

The construction of **educational facilities,** after several years in the doldrums, showed a dramatic 27% increase last year in real terms. The boom is expected to continue this year with an 11% increase in dollars and a more modest 2% increase in floor space.

Institutional construction, which showed a 10% decline in real terms in 1979, held even last year. The outlook for 1981 is much the same — an increase of 8% in dollars but a decline of 2% in floor area.

Public building construction increased by 5% in real terms last year and is expected to show a similar increase in 1981, largely because the money already is committed and not subject to President Reagan's budget cuts.

Overall, construction activity appears to be holding up amazingly well in the face of high interest rates. Part of the reason is foreign investment and part of the reason stems from the fact that much of the money was committed earlier. Continued high interest rates, which already have affected the light commercial market, could cut deeply across all construction later this year.

The economy

The long-awaited recession arrived in the fourth quarter of 1979 and resulted in a precipitous drop in the gross national product (GNP) in real terms in the second quarter of 1980, caused in large measure by the overkill credit-tightening policies of the Federal Reserve Board.

Recoveries of 2.4% and 5% in the third and fourth quarters of 1980, however, helped hold the GNP decline for the year to 0.1% ($1,481.8 billion compared to $1,483 billion in 1979 in constant 1972 dollars). It would appear that real GNP growth this year will be less than 1% — a situation that, while not recessionary, is far from a boom.

Stagflation, a term not used since 1974, perhaps best describes the present situation. The consumer price index, which increased 9% in 1978 and 13.3% in 1979, advanced 12.4% last year despite the efforts of the Federal Reserve Board. There are no indications that the inflation rate will be significantly less than a forecast 12% this year.

The uncertainty is best reflected by the nation's consumers. Although personal income rose from $1,943.8 billion in 1979 to $2,161 in 1980, per capita disposable income in constant 1972 dollars declined marginally from $4,584 in 1979 to $4,571 last year. Similarly, per capita consumption declined from $4,219 to $4,193. In the same period, personal savings as a percentage of disposable income increased a bit from 5.2% to 5.7%.

Although total personal expenditures increased 10.6% in current dollars last year when compared to 1979 expenditures, money spent for durables held constant. Motor vehicle-related expenditures dropped 6% and furniture expenditures increased 4.5%.

Money spent for nondurables, however, increased by 12%. Heading the list was a 30.3% increase in the money spent for gasoline and oil, a 10.5% increase in food expenditures, 12.8% more for services, and 5.7% more for clothing.

Energy costs (see Fuels and Energy) will continue to escalate at a rate in excess of the cost of living. Oil prices have tripled since 1975 while the price of electricity and natural gas has doubled in most areas in the same period. Decontrol of natural gas is likely to increase gas prices at a greater rate than electricity in the forseeable future, however. Oil price increases since 1973 have been unpredictable only as to timing. The spiral is ever upward.

Industrial capacity at year's end was 81.2%, down from the 86.1% at year's end in 1979. After adjusting for inflation, new orders to manufacturers held even from one year to the next. Real inventory investment, after falling at a $5 billion to $6 billion monthly clip in the third quarter of 1980, headed downward at about the same pace during the first quarter of this year. Overall production increased 4% last year.

Consumer credit declined from $325 billion in 1979 to $306 billion in 1980 and repayments increased during the same period from $286 billion to $304 billion. Reasons advanced include the high interest rates, high fuel bills, an increase in Social Security payments, and fears of an economic slowdown.

Productivity, which grew by 2.8% in 1979, dropped by 0.9% in 1980. Although fears that U.S. productivity is not advancing as quickly as almost all other industrial nations, there appears to be a direct correlation between productivity and industrial capacity utilization.

Corporate profits declined in 1980 to $199.4 billion from $212.7 billion

in 1979. Expenditures for new industrial plants and equipment expanded from $270.5 billion in 1979 to $294.3 billion last year and are expected to go to $326 billion in 1981.

U.S. exports of merchandise grew from $182 billion in 1979 to $222 billion last year. Imports, of which a large portion was imported oil, also increased from $211 billion to $248 billion. The deficit, however, dropped from $29 billion to $27 billion — almost all of which was covered by net income from U.S. investments abroad.

The increasing strength of the U.S. dollar abroad, together with any escalation in the OPEC (Organization of Petroleum Exporting Countries) oil prices could mean a substantial deficit in 1981.

Unemployment, which stood at 5.8% in 1979, increased to 7.1% in 1980. Expect unemployment this year to hover at about 7.5%.

The discount rate set by the Federal Reserve Board has bounced continuously between a low of 10% in August, 1980, to the 13% that has held sway for the last several months. The prime rate, which at one time in the past year reached 21.5%, was 18% in March, 1981, and weakening. U.S. treasury notes bounced between a low of 7% in June, 1980, to 15.4% in February, 1981. As happened last year, interest rates probably will fall this summer only to go up again in the fall. Don't expect any rates below 12% for anything but short term investments, however.

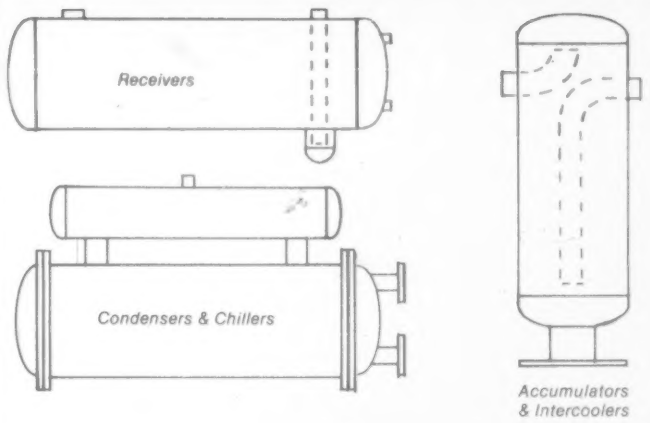
Federal Reserve Board chairman Paul Volcker told the Senate Banking Committee that the most common measure of the money supply — the amount of money in circulation and in checking accounts — grew only 6.3% in 1980 compared to 7.7% in 1979 and 8.2% in 1978.

However, it is apparent that double-digit inflation will not go away on its own, even with relatively high unemployment and low GNP growth rates, nor can the nation easily absorb a repetition of 18 changes in the prime rate in 1979, with a high of 15.75%, or 42 changes in 1980, with a high of 21.5%.

Business and personal planning becomes wild guesswork with wide fluctuations in every facet of economic life — not only with inflation and interest rates, but also with industrial growth rates, personal savings rates, and improvements in real disposable income.

The Reagan Administration promises to change all of that. We shall see.

TANKS FOR ALL REASONS



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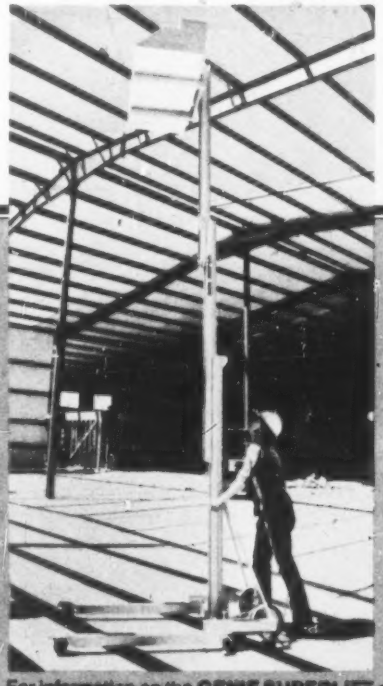

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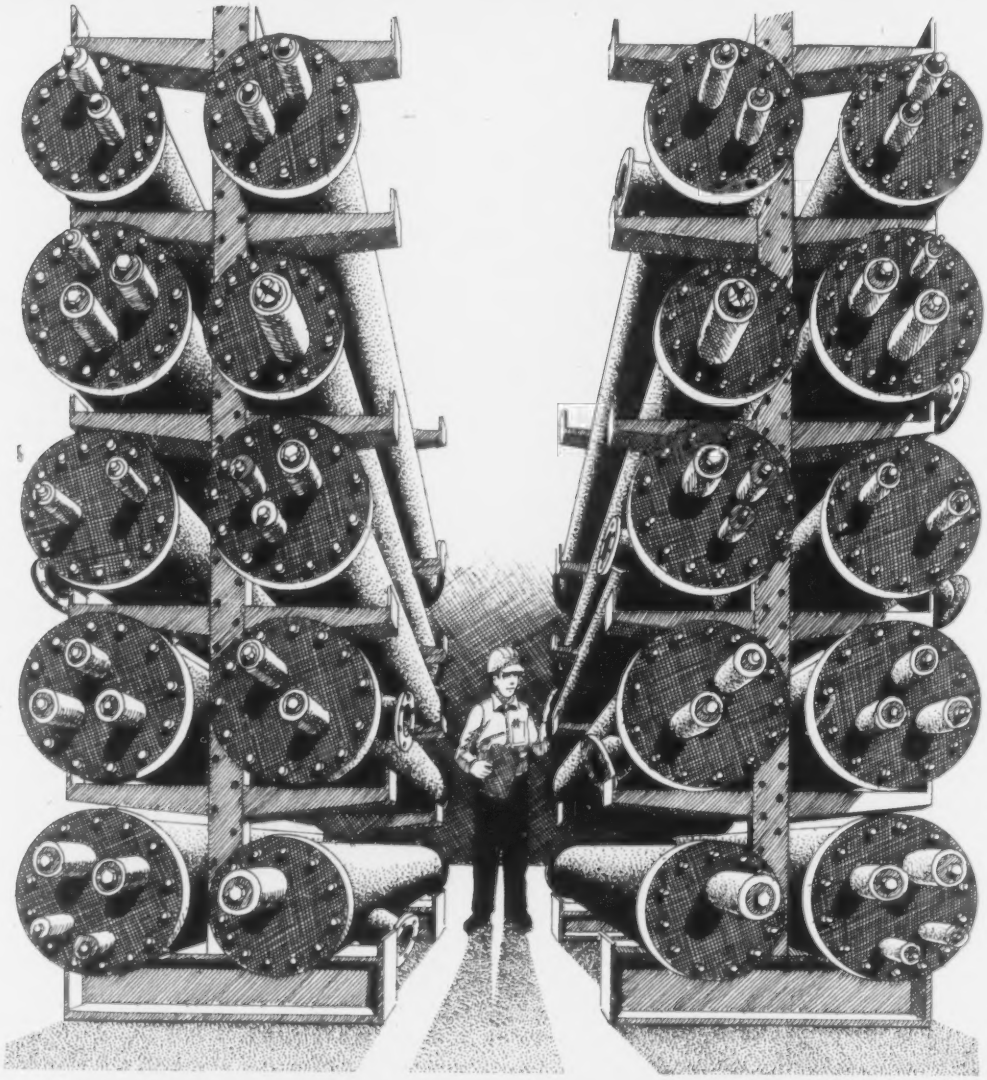

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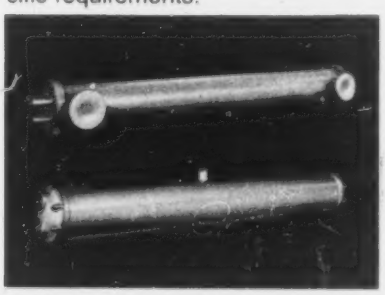

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Labor

Going into a season in which 45% of the industry's contracts will be expiring, the construction industry's bargaining this year should reflect a sluggish national economy coupled with continuing high levels of inflation. Contractors are sure to be uncomfortable with the demands of workers anxious to keep pace with the cost of living increases.

However, there is a marked change in attitude within the union segment of the construction industry, according to the Construction Labor Research Council.

While in the past the construction industry was considered the leader in negotiating large contract settlements, CLRC reports that in recent years construction is better characterized as a follower. The principal reasons include high absolute wage rages, a declining market share for unionized contractors, and a lack of productivity growth.

The Bureau of Labor Statistics reported that 61% of the workers covered by 1980 contract settlements in all industries negotiated cost of living adjustment clauses. This compares with 58% for all major contracts negotiated in 1979. Cost of living adjustments, however, were reflected in contracts covering only 15% of construction workers — few of them in the fields most associated with this publication.

CLRC has an explanation: "Since 1970 construction wage-plus-fringe rates have increased at a more rapid rate than the consumer price index — even with the last two years of high inflation rates."

The average increase in wage and fringe rates for construction workers during the last five years was $4.59, bringing the average hourly rate for all crafts in the U.S. to $15.38, according to CLRC. This is an increase of 43.2%. The largest increase ($5.46) was recorded by electricians and the smallest ($4.10) by bricklayers.

Regionally, increases less than the national average tend to be in the eastern half of the U.S. and above-average increases usually are in the west. The New England and Middle Atlantic regions, where bargaining will be heaviest this year, have had the smallest increases over the past five years.

The northwest has had the largest percentage increase of any region over the past four years, CLRC reports. Although the average wage-plus-fringe rate in this region was 41 cents/hr above the national average five years ago, it is now about $2 higher.

Bargaining activity, too, tends to be regional. It was most intense on the west coast in 1980. The focus will be on the northeast in 1981 and, in 1982, bargaining will be heaviest in the major cities of the eastern half of the North Central region.

Multiyear contracts negotiated earlier in the construction industry call for scheduled increases averaging $1.42, or 9.1% in 1981. For 1982, the percentage increase (8.9%) is slightly lower but, because of higher base rates, the dollar increase jumps to $1.62.

CLRC reports that 138 agreements have increases partly or entirely tied to increases in the consumer price index. Two-thirds of these are in California, Iowa, and Washington.

Crafts

The average wage-plus-fringe rate for United Association pipefitter and pipefitter-plumber combined locals in the U.S. on Jan. 1, 1976, was $11.90/hr. By Jan. 1, 1981, that average rate had increased by $5.15/hr to $17.05/hr, a 43% increase, according to figures supplied by CLRC.

The lowest increase was the $4.05/hr (to a 1981 rate of $14.45/hr) in the southeast. The highest were $7.83/hr (to $21.55/hr) in the northwest and $6.60/hr (to $21.45/hr) in the central southwest.

UA plumber-only locals averaged $12.37/hr on Jan. 1, 1976, and, on Jan. 1, 1981, the wage-plus-fringe package had increased by $5.05/hr to $17.42/hr, a 40.9% increase.

Members of the Sheet Metal Workers' International Association received a national average of $11.73/hr on Jan. 1, 1976. By Jan. 1, 1981, the average wage-plus-fringe rate had increased by 42.4%, or $4.92/hr. to $16.66/hr.

The lowest increase for sheet metal workers was the $3.75/hr received by locals in the southeast to bring them, in 1981, to $13.87/hr. Again the highest increases were the $6.91/hr (to $20.30/hr in 1981 in the central southwest and the $6.74/hr (to $19.48/hr this year) in the northwest.

Average percentage increases from Jan. 1, 1980, to Jan. 1, 1981, were 9.8% for sheet metal workers, 9.1% for pipefitters, and 8.7% for plumbers. However, there were a number of contract settlements in the 6% to 7% range, particularly in the middle Atlantic, north central, and mountain states.

The Bureau of Labor Statistics reported that first-year wage adjustments in 1980 contracts with cost-of-living-adjustment (COLA) provisions averaged 8% compared with 11.8% for all major contracts without these provisions. Contracts negotiated in 1980 had an average duration of 32.8 months, slightly lower than the 33.4 months when the same parties previously bargained.

The number of strikes nationally for all industries (4,000) in 1980 was the lowest since 1965, the number of workers involved (1.4 million) the lowest since 1963, and the days of idleness (31.5 million) the lowest since 1975, BLS reported, but the construction industry had no part in the achievement.

Work stoppages in the construction industry increased from 5.7% of the total in 1979 to 7.6% of the total in 1980. The number of workers involved increased from 7% of the total in 1979 to 23.2% of the total last year and days idle increased from 4.7% to 14.7%.

Nonunion

Although there is a wealth of data for unionized contractor operations, there is practically no information on nonunion pay rates. A survey of 2,000 contractors by The News earlier this year does, however, throw some light on the subject.

The News survey did not attempt to differentiate between union and nonunion contractors but, as it turned out, 77% of the 825 respondents said they were nonunion, 22% were union shops, and 1% were double-breasted.

There were some significant differences. The median labor cost per hour, including fringes, for nonunion shops was $10 to $13/hr while the comparable figure for union shops was $19 to $24/hr — nearly twice as much. New construction at 32%, had the highest incidence of union activity.

Taken together, the median labor rate, including fringes, paid by 34% of service contractors early this year was $10 to $13/hr. Another 21% paid $5 to $9/hr and 26% paid $19 to $24. The News hopes these twice-a-year surveys will continue to provide more specific data for future issues.

Bureau of the Census data

A 10-year look at air conditioning and refrigeration unit shipments

Product	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Condensing units	485,419	407,034	391,992	501,313	474,771	334,679	417,286	529,515	537,082	497,833
Compressors & compressor units	14,653,110	16,272,922	16,692,164	21,812,788	19,134,563	19,240,243	22,761,950	23,991,643	25,790,862	24,153,695
Ammonia compressors	2,097	1,475	1,564	1,725	1,714	1,449	1,453	1,443	1,819	1,765
Fancoil units[1]	277,094	245,742	225,017	265,699	284,267	200,807	193,587	198,939	186,827	178,417
Induction units[2]	139,009	119,324	92,631	48,341	38,422	42,636	21,112	—	—	—
Central-station air handlers	61,109	55,200	58,630	51,260	53,621	47,691	48,616	52,371	52,441	60,097
Unitary air conditioners[3]	1,481,090	1,723,591	2,140,504	2,726,269	2,392,193	1,561,385	2,399,638	2,829,447	3,226,998	3,061,205
Unitary heat pumps	83,977	74,943	80,937	104,267	119,983	160,485	320,043	536,558	371,436	418,664
Packaged terminal air conditioners	126,546	159,858	204,785	294,198	268,253	189,927	182,608	261,777	148,332	171,879
Room air conditioners	5,437,842	4,938,138	3,923,390	4,937,384	4,244,586	2,648,430	2,805,124	3,303,335	4,030,423	3,756,382
Centrifugal chillers[4]	4,056	3,993	3,775	3,875	4,496	4,647	2,994	2,977	2,975	3,141
Reciprocating chillers	9,128	9,214	9,258	10,126	11,130	9,279	7,114	8,665	9,003	9,697
Absorption chillers	1,499	1,302	1,155	2,222	1,087	740	571	588	470	392
Adsorption, open-type absorption	1,646	1,676	2,002	Combined	—	1,672	1,866	2,318	2,704	2,503
Cooling towers[2]	16,390	14,034	14,747	14,733	13,950	13,212	11,156	8,517	9,906	—
Evaporative condensers	1,913	1,711	1,928	3,276	3,112	2,764	2,094	2,299	2,453	2,517
Mobile vehicle air conditioners	3,463,321	5,348,262	5,851,080	6,462,307	6,891,353	9,137,453	11,978,679	9,459,535	9,074,932	7,651,618
Mobile air conditioners for trucks, agricultural, construction equipment	109,392	194,067	370,015	577,361	905,993	1,412,508	2,320,911	2,452,820	1,298,198	2,292,676
Mobile vehicle refrigeration systems[5]	52,407	62,309	60,645	68,992	67,494	63,864	70,836	76,536	70,731	76,395
Unit coolers[6]	149,918	160,201	148,623	192,766	186,312	161,287	195,738	197,975	194,905	187,253
Ice-making machines	103,575	112,811	132,278	121,245	124,075	128,288	187,887	165,106	194,049	201,283
Drinking water coolers	271,937	247,381	314,524	384,745	373,723	262,173	307,570	335,173	373,885	411,687
Dehumidifiers	619,033	331,208	439,963	730,427	645,287	525,407	502,141	351,188	477,692	709,363

Source: Bureau of the Census Current Industrial Reports MA-35M, Air Conditioning and Refrigeration Equipment, Including Warm Air Furnaces. [1]Excludes vertical stack types for 1977. [2]Withheld to avoid disclosing operations of individual companies. [3]See related story in Air Conditioning section. [4]Excludes open-type units in 1978 and 1979. [5]Excludes railway freight cars for 1974 and succeeding years. [6]Excludes floor-mounted dry and spray types in 1979.

Wholesalers

Air conditioning and refrigeration parts and supplies wholesalers are not bullish about 1981, according to a late 1980 forecast by members of the Air-conditioning and Refrigeration Wholesalers (ARW) that is the lowest in many years. (See accompanying table.)

ARW wholesalers are projecting a 10.2% increase in dollar volume for 1981 compared with last year. Coupled with last year's actual increase in sales of 8.8% — a 13% increase had been forecast — it would appear parts-and-pieces wholesalers can expect two flat years in a row.

Interestingly, the forecast calls for a 10% increase in the sale of unitary air conditioners of 4 tons and less, and an increase of nearly 12% for unitary equipment of more than 4 tons. Refrigerant sales, too, are expected to be up 10% in 1981. The biggest gainer is expected to be replacement compressors, which are expected to increase in dollar volume by 16.7% compared to 1980 experience.

Wholesalers are less optimistic about grilles, registers, and diffusers (only a 5.5% dollar increase projected compared with a 9% forecasted increase a year before).

Similarly, sheet metal and fittings are expected to grow by only 2.8%, down about seven percentage points from the year-ago forecast.

In a later report, ARW estimated the total dollar volume of its U.S. members at $1,161,688,000 for 1980, up 10% from the previous year. The volume of Canadian members last year was estimated at $140,651,000, up 40% over the year-previous figures.

The biggest U.S. increases last year were 16.8% in Region 7 (North

(Next Page, Please)

Percentage of dollar value potential for 1981 vs 1980

	Northeast	Southeast	Central	Southwest	West	Total	Canada
Unitary AC&H equipment (4 tons and under)	1.0	14	7.2	10.3	17.7	10	17.3
Unitary AC&H equipment (over 4 tons)	9.8	10	8.1	6.3	5.7	11.9	5.7
Refrigeration condensing units	15.0	7.7	8.3	8.0	10.7	9.9	11.3
Refrigeration coils	13.7	9.5	7.5	9.6	10.6	10.2	15.3
Replacement compressors	18.3	16.3	12.8	25.5	10.6	16.7	19.3
Refrigerant	12.8	13.3	9.3	6.6	7.7	9.9	5.0
Driers, strainers, filters, and sight glasses	13.5	11.3	11.0	6.7	9.0	10.3	5.0
Refrigerant flow controls — TEV, solenoid, and regulating valves, etc.	10.2	10.3	9.6	7.8	10.0	9.6	15.0
Pressure and temperature controls	8.0	12.4	10.8	8.7	8.4	9.7	11.7
Electrical controls — relays, contactors and starters	11.5	11.3	9.1	5.3	10.4	9.5	11.0
Capacitors	12.3	12.6	6.7	8.7	7.2	9.5	12.7
Electric motors	15.0	11.5	7.8	10.5	11.5	11.3	11.7
Pipe and tubing fittings	9.0	8.7	8.9	4.8	3.5	6.9	12.3
Pipe and tubing insulation	9.2	9.7	9.0	5.0	5.9	7.8	12.3
Grilles, registers, and diffusers	—	9.3	3.0	6.8	3.0	5.5	1.0
Sheet metal and fittings	—	1.3	5.0	6.0	10.0	2.8	10.0
Air filters and air cleaners	9.0	8.5	6.9	3.8	5.2	6.7	7.5
Water treatment and maintenance chemicals	6.8	3.8	5.1	0.2	4.9	4.1	11.7
Instruments and equipment	8.0	8.6	8.5	1.0	5.2	6.3	5.0
Totals	**10.8**	**10.0**	**10.4**	**7.4**	**8.3**	**10.2**	**10.6**

1981 SALES FORECAST undertaken by members of the Air-conditioning and Refrigeration Wholesalers shows an overall gain of 10.2% in dollar volume over 1980. Regions with the five areas are: Northeast (Regions 1, 2, and 10); Southeast (Regions 3, 4, and 12); Central (Regions 5, 6, and 7); Southwest (Region 8); and West (Region 9). Percentages were weighted by the total annual sales volume of responding wholesalers.

Wholesalers--

(Continued from Preceding Page)

and South Dakota, Nebraska, Wyoming, Colorado, Kansas, Missouri, Iowa, and Minnesota) and 16% in Region 3 (Maryland, Virginia, D.C., and Delaware).

The eight western states recorded only 3.5% growth last year but rebounded in the fourth quarter with a 22.7% increase. Wisconsin and Illinois, however, showed a 10% drop in the fourth quarter and only a 4.4% increase for the year.

Members of the Northamerican Heating and Airconditioning Wholesalers Association (NHAW) have initiated a 3-year forecast, revised each quarter, for five key product groups — air conditioning, refrigeration, controls, sheet metal, and plumbing (which includes liquid solar systems and hydronic heating).

The forecast is prepared for NHAW by William A. Spooner Associates, Inc., using an econometric model maintained by the University of California-Los Angeles (UCLA) and sales data supplied by NHAW members.

It provides members with forecasts in three modes — one that reflects seasonal fluctuations and unadjusted dollar volumes, one that is annualized to eliminate seasonal fluctuations and show trends more clearly, and the one we have reproduced here which has been annualized and adjusted for inflation to more accurately portray physical volume.

The study indicates that:

Air conditioning sales, in terms of units, dropped to 75% of the base level (second quarter, 1980) by the fourth quarter of last year. They will increase to only 80% of the base level for the rest of this year, then rise steadily until, at the end of 1983, equipment sales will be 145% of the base period in units and 170% of the base period in dollars.

Air conditioning includes air heating and cooling equipment and components, air filtering and dehumidifying equipment and components, and air-to-air solar equipment and components.

Refrigeration sales will hold steady this year at 95% of the base period in terms of units. An upward turn will come in the first quarter of 1982 and result, by the end of 1983,

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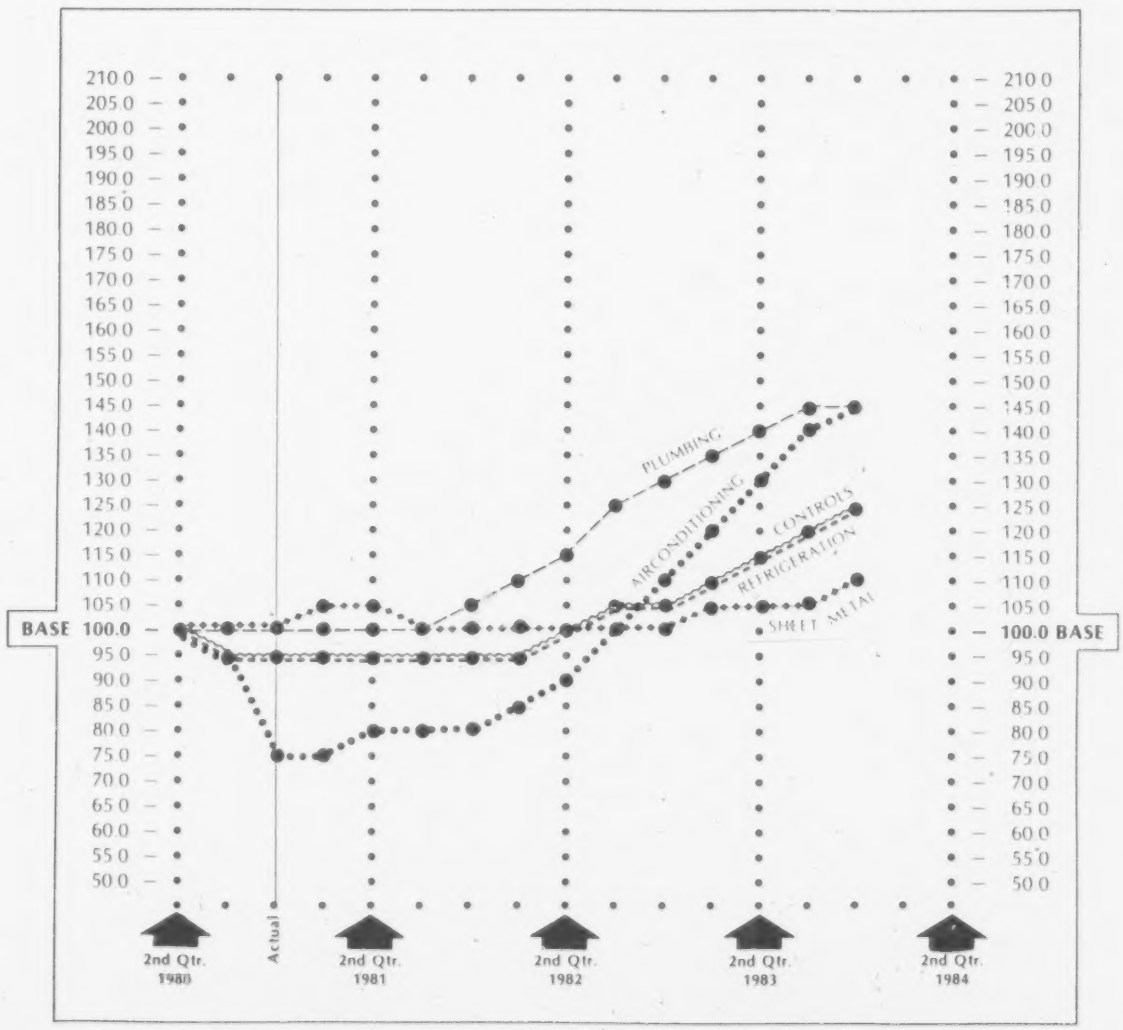

1981 TO 1983 FORECAST has been deseasonalized and adjusted for inflation to reflect physical volume rather than dollars. The index of real growth is based on a sales level for the second quarter of 1980 equalling 100.

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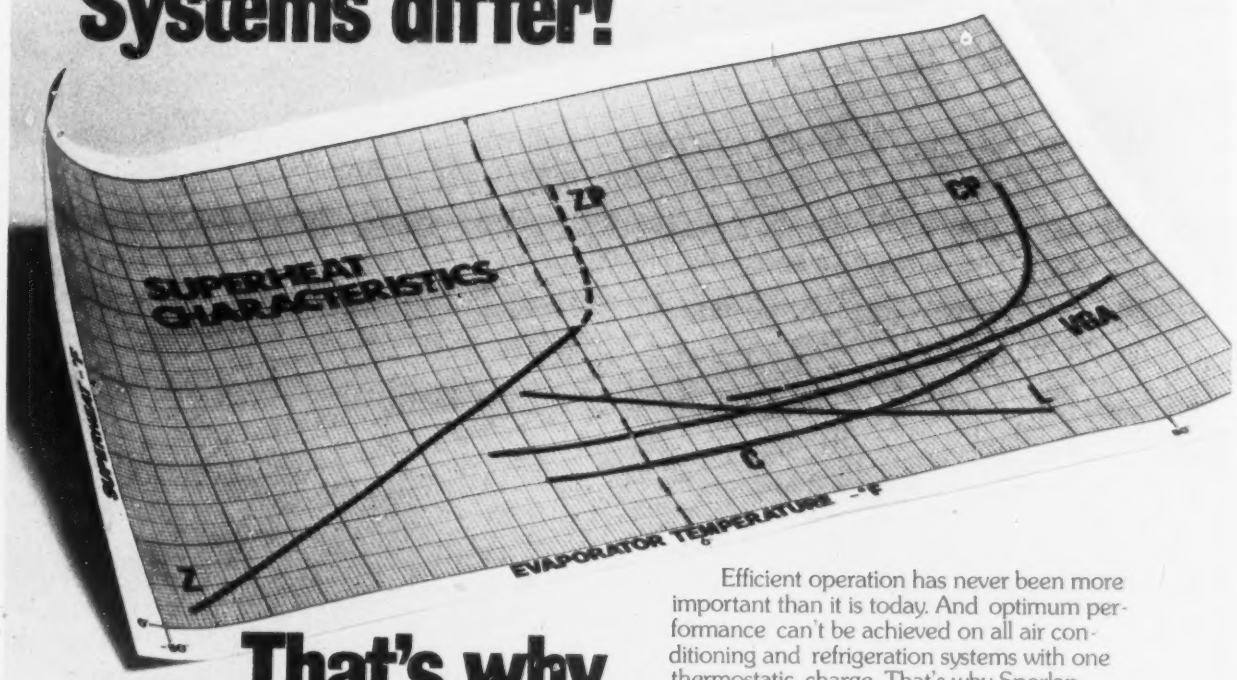

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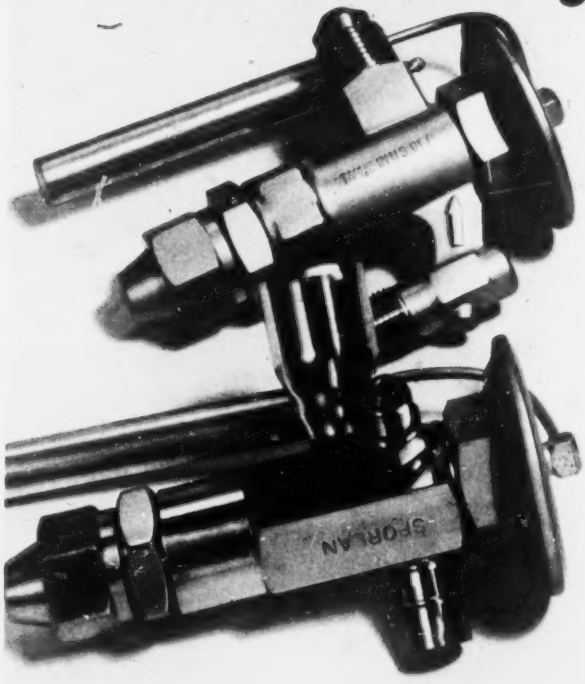

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Low Temperature Range

Z "Cross Charge" with a decreasing superheat characteristic so important on applications below 0°F.

ZP Pressure limit (MOP) "Cross Charge" offers same operating characteristic as the "Z."

X "Cross Charge" with similar characteristics as the "Z" for temperatures below −40°F (not shown above).

For more details on Sporlan TEV's with selective charges, write or call for Bulletin 10-10.

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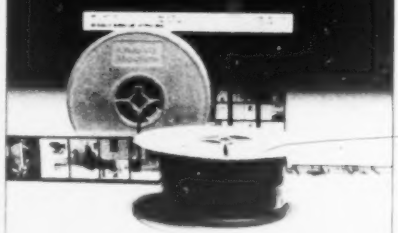

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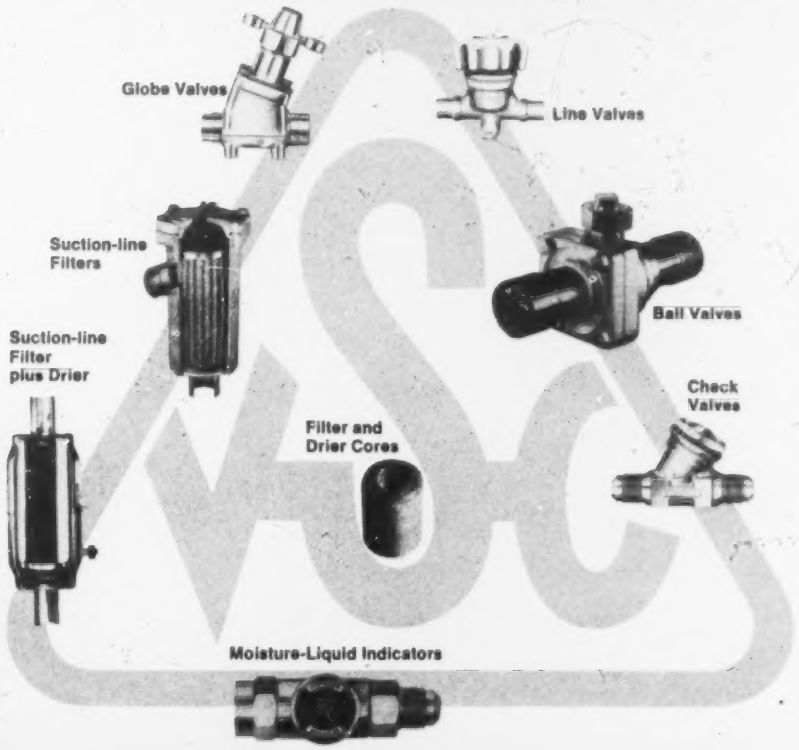

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Wholesalers--

(Continued from Page 118)

in a 125% increase over base period units and a 150% increase in dollars.

Refrigeration includes refrigerants, refrigeration parts, supplies, and accessories.

Controls follow almost exactly the trend lines for refrigeration in both units and dollars. Controls also include control parts and accessories.

Sheet metal sales show only a modest 5% to 10% gain through 1983 in real terms but also should not drop below the base period during the three years. Dollar growth, however, should grow to 135% of the base period by the end of 1983.

Sheet metal includes metal and nonmetal flat sheets and components of air-handling systems, insulation, raingoods, fabricating machinery and tools.

Plumbing, should hold relatively steady in real terms until the end of this year, then increase steadily to 145% of the base period by the end of 1983. Dollar volume for plumbing products, however, started its steady upward climb in the first quarter of 1981 and, by the end of 1983, should amount to 170% of the base period.

Plumbing also includes hydronic heating equipment and components, liquid solar systems and components.

NHAW members reported an average dollar sales drop of 1% for all members in 1980 when compared with the previous year. The median decrease was 0.18%. Canadian members reported an average drop of 0.4% but, by using the median, showed a growth of 4.6%.

With 130 firms reporting, NHAW provides data for 12 regions. It does not estimate total dollar volume for all members, however.

The greatest growth during the past year was in Region 7, which includes Mississippi, Alabama, Georgia, South Carolina, Florida, and Puerto Rico. It showed an average growth rate of 6% which, when adjusted for inflation, is a negative quantity in real terms.

The largest decreases were the average 14% drop in Region 9 (Montana, Wyoming, Colorado, New Mexico, and Utah) and an average decline of 9.75% in Region 10 (California, Nevada, Arizona, and Hawaii).

The decline has carried into January, 1981, which recorded an average sales loss for all members of 7.34% when compared with January, 1980. The median drop was 5%.

Fuels and energy

United States energy consumption in 1980 dropped to 76.1 quadrillion Btu (quads), about 4% less than the year-previous total of 79 quads and 2.6% less than the 1978 total of 78.2 quads, according to the U.S. Department of Energy.

In the residential and commercial sector, the 29.075 quads consumed last year was down 0.9% from the levels of both 1979 and 1978. In 1980, this sector represented a 38.2% share of the total, up from 37.1% in 1979.

Industrial sector consumption amounted to 28.5 quads last year, down 4.6% from the 29.8 quads consumed in 1979 and down 0.8% from 1978 levels. The 1980 industrial consumption was 37.4% of the total.

Consumption in the transportation sector in 1980 totaled 18.6 quads, down 6.6% from the 19.89 quads consumed in the previous year and down 9.9% from 1978 levels. The 1980 total represented 24.4% of the total consumption compared to 25.2% in 1979.

Electric utilities consumed an estimated 25 quads of energy in 1980, 2.4% higher than in the previous year and 6.7% higher than in 1978. Of the 1980 energy consumed, 48.4% was coal, 15.3% was natural gas, 12.7% was oil, 12.3% was hydro, 10.9% was nuclear, and 0.5% was geothermal, wood, and waste.

Of the 29.075 quads used last year in the residential and commercial sectors, 0.65% was coal, 26.2% was natural gas, 20.7% was oil, 15% was electricity sold, and 37.4% was represented by electrical generation and transmission losses.

Similarly, the 28.482 quads used by the industrial sector breaks down this way for 1980: 11.6% coal, 29.4% natural gas, 24.9% oil, 0.13% hydroelectric, 9.74% electricity sold, and 24.4% electricity generation and transmission losses.

According to Bureau of the Census figures, the average cost of residential fuel oil increased 91.8% (from 53.3 cents/gal to $1.022/gal) from November, 1978, to November, 1980. During the same period the average cost of residential natural gas rose 36.8% (from 30.4 cents/therm to 41.6 cents/therm) and electricity rose 32.6% (from 4.6 cents/kWh to 6.1 cents/kWh).

Electricity

An increase of 1.7% in electric output in the United States was reported by the Edison Electric Institute. Output last year was 2,317 trillion kWh compared to 2,279 trillion kWh in 1979.

Peak power demand in the U.S. rose in the summer of 1980 to a record 438,100 megawatts, up 6.8% from the previous record of 410,055 megawatts set in 1979. The peak is a reflection of last summer's record heat wave with its accompanying high demand for comfort cooling.

The expected peak for the 1980-81 winter is 390,156 megawatts and it should rise 4.4% next winter to 407,403 megawatts. Similarly, the 1981 summer peak for the same contiguous 48 states is expected to be 439,865 megawatts, 3.9% lower than the expected 1982 summer peak of 457,061 megawatts.

Total kWh sales in 1980 increased by 0.9% to 2,096,833,840 thousand kWh compared to 2,077,788,930 thousand kWh in 1979. Commercial sales, at 509,814,832 thousand kWh, were up 3.1%; industrial sales, at 791,595,753 thousand kWh, were down 2.7%; and residential sales, at 721,116,095 thousand kWh, were up 3.9%.

Installed capacity in all 50 states in 1980 was 610,392 thousand kW, up 2.3% from 596,928 thousand kW in 1979. The total number of customers increased by 2.4% in the same period, from 89,326,000 in 1979 to 91,441,000 in 1980.

Electricity's relationship to overall economic activity has been undergoing change since the rapid escalation in oil prices began in 1973. Between 1960 and 1973 the relationship between increases in the GNP and growth in electrical output averaged about one to two — for every 1% increase in GNP, electric power usage grew by a little more than 2%.

Looked at another way, GNP growth was roughly half as dependent on increases in electrical output during the post-1973 period compared to the cheap energy years. For the three years 1977 to 1979 the

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relationship was less than one to one.

In terms of new capacity, there are 277 new coal-fired generating plants scheduled for completion in the 1981-1988 period with a total capacity of 142,107 megawatts, according to a National Coal Association study.

Nine new oil-fired units with a combined capacity of 5,502 megawatts, all started in the early 1970's, will be in operation by the end of 1982. No new natural gas-fired units are planned.

The 93 new nuclear power plants (with a combined capacity of 102,431 megawatts) scheduled for completion in the 1981-1988 period will add to the 75 nuclear units already operating. Utilities are planning another 329 nonsteam (hydro, combustion turbines, internal combustion, combined cycle, geothermal) generating units with a combined capacity of 27,026 megawatts in the same time frame.

Since 1979, utilities have reported significant delays in projects representing 57% of coal-fired capacity and 71% of nuclear capacity. The most common reasons are revisions in forecast electricity demand, delays in siting or licensing, problems with the preparation of environmental data, or financial uncertainties.

The National Electrical Rehabilitation Council, which keeps track of generating capacity, reports that 18.5% of the total new generating capacity due to come on stream from 1976 to 1985 will be delayed until 1989 and that a further 18.7% will be delayed even longer or canceled altogether.

Natural gas

Gas utility thermal equivalent sales totaled 15,318.3 trillion Btu in 1980, only 0.7% below the 15,440.3 trillion Btu sold in 1979, according to the American Gas Association (AGA). The increase from 1978 to 1979 amounted to 7.2%.

Industrial sales, which represent just over 50% of the total, increased by 2.2% from 7,555 trillion Btu in 1979 to 7,723 trillion Btu in 1980. Residential sales, which represented 31.7% of the total, dropped 4.5% from 5,083.1 trillion Btu in 1979 to 4,853.4 trillion Btu in 1980. Commercial sales, representing 15.9% of the total, decreased by 2.2% from 2,485.8 trillion Btu in 1979 to 2,431 trillion Btu in 1980.

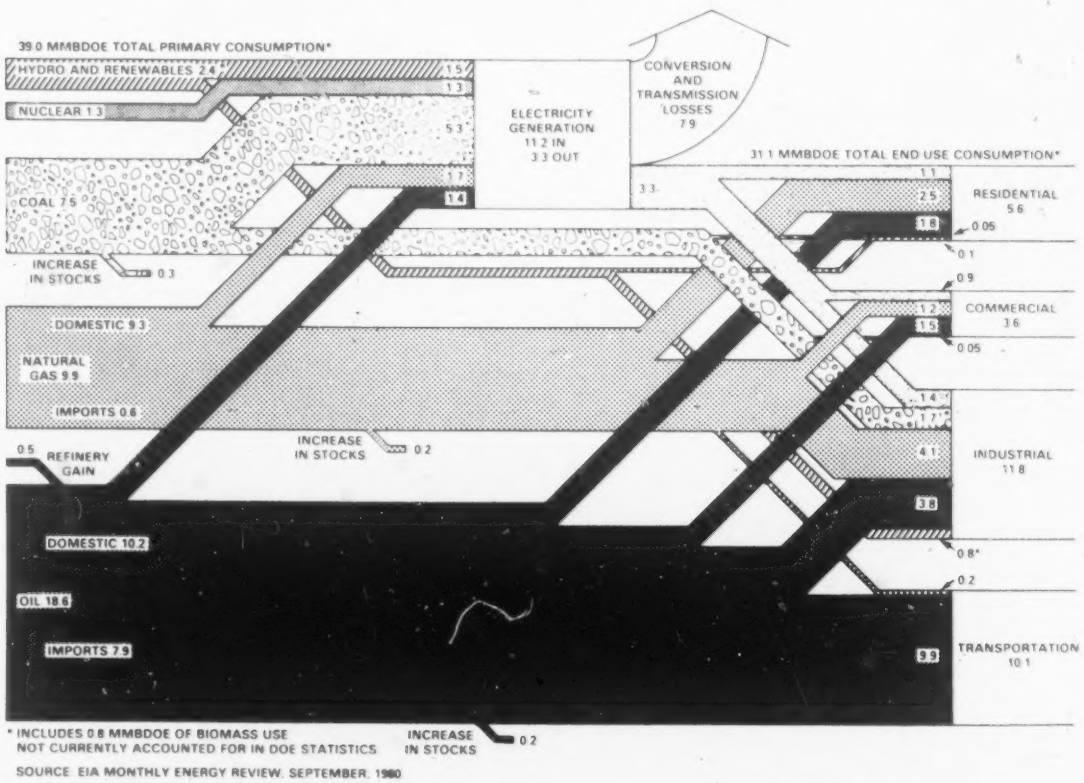
AGA reported that average annual gas utility prices, expressed in dollars per million Btu, for 1972 were: all $0.73; residential $1.19; commercial $0.91; industrial $0.45; and other $0.41. In 1979 they were: all $2.52; residential $2.92; commercial $2.66; industrial $2.24; and other $1.67. In the third quarter of 1980 they were: all $3.18; residential $4.36; commercial $3.57; industrial $2.89; and other $2.03.

Coal

U.S. coal production in 1980, at 830 million tons, was 9.8% ahead of the 776 million tons produced a year earlier, according to the National Coal Association. NCA forecast that production this year would increase 2.4% to 850 million tons — but only if production is not interrupted.

The association obviously was referring to a probable coal strike which could last for three months or more. A strike vote was scheduled just as Statistical Panorama went to press. In 1978, when the last strike occurred, production was 653.8 million tons.

Coal consumption in the U.S. last year totaled 697.6 million tons, a 3% increase over the 677.3 million tons



U. S. ENERGY SOURCES and uses in 1979 expressed in millions of barrels per day of oil equivalent.

consumed in 1979. Electric utilities, which used 81% of all coal consumed in the U.S. last year, increased their coal usage 7.65% from 526 million tons in 1979 to 566.2 million tons in 1980. Coking coal, about 10% of coal consumption, decreased 12.5% from 77 million tons in 1979 to 67.4 million tons last year. General industry consumption, about 9% of the total, dropped 14% from 74.3 million tons in 1979 to 63.9 million tons in 1980.

Although coal exports to Canada dropped 10.5% from 19.1 million tons in 1979 to 17.1 million tons last year, overseas coal shipments increased dramatically by 59.7% from 45.6 million tons in 1979 to 72.8 million tons in 1980. Shipments were only 24.6 million tons three years ago.

The U.S. has supplied the world steel industry with a significant part of its coal for decades and, today, is being asked to help other nations — particularly in Europe and southeast Asia — shift from oil to coal for industrial and utility boilers. Overseas shipments of U.S. steam coal went from near zero in 1978 to 2.5 million tons in 1979 and 16 million tons in 1980.

NCA estimates 1981 shipments of steam coal to overseas destinations could reach 25 million tons. However, it adds that exports of steam coal could have been 10 million to 15 million tons larger last year if it had not been for inadequate U.S. port facilities, which now are being expanded. A federal government study suggests that the U.S. could be exporting 200 million tons of steam coal by the year 2000, or 38% of the world requirement.

Exports of metallurgical coal, which increased 31.8% from 43.1 million tons in 1979 to 56.8 million tons in 1980, are expected to amount to only 53 million tons this year because of a slowing world economy. An additional 7 million tons is expected to go to Canada, which imported 6.3 million tons of U.S. metallurgical coal last year.

Of the 830 million tons of coal produced in the U.S. last year, production in the east — which produces 70% of the total — rose 4.9% from 554.9 million tons in 1979 to 582 million tons last year. Production in the west increased by 12% from 221.4 million tons in 1979 to 248 million tons in 1980. NCA expects 587 million tons from the east and 263 million tons from the west this year.

Also in 1981, NCA expects domestic consumption to increase 7% to

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747 million tons. Electric utility usages is expected to increase by 5% to 595 million tons and coking coal is expected to come back to within 5 million tons of 1979's 77 million tons.

NCA estimates that coal demand from utilities could be as low as 778 million tons in 1990 or as high as 1.04 billion tons. The exchange of electric power from oil-burning areas to coal-burning areas has gone about as far as it can go, NCA said, and additional growth must come from new coal-fired generating plants and from conversions from oil.

The most dramatic increase will come from steam coal exports to countries other than Canada — from 16 million tons last year to as much as 79 million tons in 1990. Government policies relating to dredging and port facility siting could be a major factor in this market, however.

Industrial and retail coal use is expected to grow to 160 million tons, less if air pollution requirements become more stringent or natural gas prices still are controlled. Demands of the synthetic oil and gas market are expected to range from 9 million tons to 75 million tons by 1990.

The demand for metallurgical grade coal used for steel making is expected to remain stagnant through 1990 because of an anticipated decline in domestic coke oven capacity. The NCA forecast is predicated on the assumption that the leasing of federal lands in the west will not limit production.

Imports

Net energy imports into the United States declined by 28.6% last year, from 16.802 quadrillion Btu (quads) in 1979 to 12.038 quads in 1980, due primarily to a 19.7% decline in petroleum imports to the lowest level since 1975 and an increase of 37.9% in coal exports.

The net value of energy imports, however, increased 30.7% from $54.4 billion in 1979 to $71.1 billion in 1980. Total energy imports last year were $79.1 billion, up 31.7% from $60 billion in 1979. Exports, on the other hand, increased by 42% from $5.6 billion in 1979 to $8 billion in 1980.

Energy production in the United States increased to an all-time high of 64.6 quads, 1.1% more than the 63.7 quads produced in 1979.

This growth was due primarily to a 6.7% increase in coal production (from 17.5 quads in 1979 to 18.7 quads in 1980). Petroleum production increased 0.3% (from 20.4 quads in 1979 to 20.5 quads last year) while natural gas production dropped 2.2% (from 20.04 quads in 1979 to 19.66 quads last year) and energy production from all other sources declined 1.2% (from 5.8 quads in 1979 to 5.7 quads in 1980).

In 1980, then, 31.7% of domestic energy production was petroleum, 30.4% was natural gas, 29% was coal, and 8.9% came from all other sources within the U.S.

Imports, almost all petroleum, were the equivalent of 18.6% of total domestic production. Put another way, imports accounted for 15.8% of total U.S. energy consumption, which dropped 4% in 1980 from 79.06 quads in 1979 to 76.14 quads last year.

On the home front:

- Motor gasoline consumption dropped 6.3% from an average of 7,034,000 barrels a day in 1979 to 6,593,000 barrels a day in 1980.
- Distillate fuel oil consumption decreased by 13.4% from an average of 3,314,000 barrels a day in 1979 to 2,871,000 barrels a day in 1980.
- Residual fuel oil consumption dropped 10.8% from an average of 3,023,000 barrels a day in 1979 to 2,522,000 barrels a day last year.

Exploration

Exploration for petroleum and natural gas in the U.S. increased to record levels in 1980.

Drilling rigs in operation averaged 2,910 for the year, 33.7% above the 1979 level of 2,177 rigs and 8.2% above the previous high of 2,686 rigs reached in 1955. The level of drilling in 1979 was twice that of 1973 and, last year, the level of drilling was three times that of 1973.

Solar

The statistical basis for the solar industry is somewhat confusing because both the Department of Energy and, since 1978, the Bureau of the Census, keep figures on solar collector production. Each, however, marches to a different drummer — DOE in square feet and the Census Bureau in units.

DOE reports that in 1974 a total of 45 manufacturers shipped 1,274,000 ft² of solar collectors, of which 89% was the low-temperature type and 11% was medium temperature, special, and other types. In 1977 a peak number of 297 manufacturers produced 4,743,000 ft² of low-temperature and 5,569,000 ft² of medium temperature collectors for a total of 10,312,000 ft², an increase of 78% over the previous year.

According to DOE, the production of collectors in 1978 rose only 5% to 10,860,000 ft², of which 54% was low temperature and 46% was medium temperature. For the same year, the Census Bureau reported 37,882 flat-plate air collectors and 128,498 flat-plate liquid collectors. There were 4,231 concentrating collectors of all sizes.

For 1979, the Bureau of the Census reported shipments of 32,409 flat-plate air collectors, a decline of 15%, and 194,250 flat-plate liquid collectors, an increase of 51% over the previous year's shipments. Of the liquid collectors, 84% were low-temperature collectors and 16% were medium-temperature units. Figures for concentrating collectors were withheld to avoid disclosing the operations of individual companies.

The latest DOE figures cover the first half of 1980 when 8,829,000 ft² of collectors were shipped by 223 manufacturers. This represents an increase of 27% in collector shipments over the same period a year earlier but a decrease of 12% from the 249 manufacturers reporting in the earlier period.

The split on the first-half 1980 shipments was 68% low- and 32% medium-temperature collectors. (Low-temperature collectors generally operate at temperatures below 110°F. Medium-temperature collectors generally operate in the 140° to 180° range but can operate at temperatures as low as 110°. Special collectors include evacuated tube and concentrating types.)

Looking at the same 1980 period, the U.S. imported 92,903 ft² of collectors (16% low-temperature and 84% medium-temperature units) and exported 545,293 ft² (81% low-temperature units). This represents a drop of 74% in imports and an increase of 183% in exports over the comparable period a year earlier.

In terms of end uses, most (6,069,000 ft² or 69%) of the domestic production went for swimming pool heating. The next biggest use (1,576,000 ft² or 18%) was heating domestic hot water.

Of the remaining 13% of production, 786,000 ft² were used for space heating, 91,000 ft² for air conditioning, 159,000 ft² for industrial processes, and 24,000 ft² for agricultural applications.

Our unofficial estimates of unitary market shares

When it comes to figuring the shares of the unitary air conditioning market held by individual manufacturers, we must rely on "feel" rather than reliable numbers. There are no reliable numbers.

Each year, too, the percentages shift a bit as companies enter or leave the market, one company is acquired by another, or distribution-product-promotion improvements are reflected in the marketplace.

And like all national figures, they don't give a clear picture of market shares in any specific city or area of the country. In fact, some of the essentially regional manufacturers, with a small national share of the market, often are among the leaders in those areas where their distribution is concentrated.

Another distortion comes from the interest of the reader. Whether a particular manufacturer is strong in the new-home or the add-on market makes little difference to many. But to a contractor who specializes, the list of competitive brands can expand or contract according to his interests — and change when his emphasis changes.

Because of these and other situations within their own cities, contractors often get a distorted view of national market shares. For them, and for researchers and others not deeply involved in the air conditioning industry, The News offers these educated guesses of unitary equipment market shares in units:

Carrier (including Bryant, Day & Night, Payne) — 23%

General Electric — 12%

Lennox — 12%

Rheem-Ruud — 11%

Whirlpool, Heil-Quaker — 7%

York — 4%

Friedrich (including International) — 4%

Westinghouse (including Luxaire, Fraser-Johnston) — 3%

Fedders (including Airtemp, Mueller Climatrol) — 3%

Magic Chef (Johnson, Air-Ease, Williams, Armstrong, Gaffers & Sattler), Trane — 2% each.

The list adds up to more than 80% of the unitary market. The real difficulty comes in attempting to rank those manufacturers with a 1%, 2%, or 3% market share. It must be remembered, too, that 2% of a 2.5 million market means annual shipments in the order of 50,000 units.

The replacement market

The summer of 1980 presented living proof that the seasonal aspect of the air conditioning business is far from dead. With the other air conditioning industry bellweather, new housing construction, in decline, the extended heat wave added substantially to the replacement and add-on business — and significantly reduced stocks in distributor and manufacturer warehouses.

But the industry is moving toward a point, probably still four or five years away, when the influences of weather and of new housing starts will have much less effect than today. It will be brought about by changing fuel preferences, such as the growing reliance on the heat pump in all of its forms, and on a maturing air conditioning market that will generate as many replacements as new installations.

There would still be good years, of course, if housing starts should go considerably above average or if the weather turns extremely hot. But there should not be any truly bad years simply because of replacements and a basic number of add-on installations.

Unitary

With this in mind, we have tried to take a look at some aspects of the residential and commercial replacement markets which, while far from scientific, does represent our best judgement.

In the case of unitary air conditioning, the replacement market has to be separated into three parts — commercial, heat pumps, and residential comfort cooling.

There is strong evidence that the commercial unitary market, which has averaged more than 300,000 installations annually for more than two decades even though its share of the total unitary market has diminished markedly, still is holding its own.

It is our estimate that at least 22% of the unitary equipment shipped today is for replacement purposes and that, in the case of commercial equipment, the proportion is more like 25%. And at shipment levels of 380,000 commercial units last year, that's 95,000 replacements.

Not all of these are all-year rooftop units, of course, but a growing number are. Many were installed in the 1960's and have simply worn out. Too, there is evidence that some owners, who purchased units when low first cost was more important than efficiency, are replacing older units with equipment that has a much higher efficiency and, probably, the ability to use outdoor air for near-free cooling when temperatures and humidities are right.

Another major factor in the rooftop replacement market has been fuel price and availability. Many units were installed with electric resistance heating in the 1972-1978 period when natural gas was not available. The availability of gas in the last three years has influenced some to replace older rooftops in order to get the advantage, in many parts of the country, of lower operating costs.

Rooftop heat pumps, too, are gaining a growing share of the market. The News estimates that they amounted to about 10% of the heat pump market last year, or about 45,000 units, and that about 5,000 of these were replacements — mostly of rooftops equipped with straight cooling and some other form of heating.

Even though shipments of unitary heat pumps in recent years have been hovering at about the half-million mark, it must be remembered that shipments averaged only about 100,000 units until 1973. Most of these went into southern markets.

The heat pump replacement mar-

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The replacement market--

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ket, then, has held to relatively modest numbers. We estimate that the replacement market for heat pumps, including commercial, was about 65,000 units last year and will increase only slightly in 1981.

Residential cooling

The residential air conditioning replacement market is much larger and is growing every year. In 1970 the Bureau of the Census tells us there were 7,263,000 homes equipped with central air conditioning. When the 1980 census figures are released, they are likely to tell us that at least another 4 million homes have been added since that time.

We must consider that many of the 7 million units in place in 1970 will have been replaced. However, most of them will themselves become replacement candidates in 12 to 14 years, the average life of a central unit.

It is also important to note that, for about a decade, the industry has been adding central air conditioning units — both new and replacements — at an annual rate of about 1.5 million units annually. This means that, in the next few years, the replacement market should rise to approach that average. Add about 1 million new home installations and the industry base becomes about 2.5 million units a year.

We estimate that, in 1980, replacements accounted for 390,000 units, or 22% of the residential (excluding heat pumps) equipment shipped last year. Add to this another 48,000 residential heat pump replacements.

For those who would like to compare their own methods or take issue with our logic, we broke down the 1980 total unitary shipment figures this way: 1.02 million into new residential construction; 325,000 commercial; 44,000 into mobile homes; 305,000 add-on sales; and 435,000 replacement units.

Add-ons

The add-on market was an extremely active one in the 1960's and in the early 1970's but is becoming a lesser percentage of the total as central air conditioning penetration into the 90-million housing inventory continues to build.

It will continue to be an important — and profitable — market for many and, probably, will never fall below 250,000 units in the foreseeable future. Its prime markets continue to be those areas where comfort cooling penetration in new homes is climbing fastest.

Normally, add-on sales tend to increase dramatically when new home starts are depressed because, we feel, many people elect to fix up their present homes rather than buy a new one. The estimated 305,000 add-on sales last year did not reflect this trend, however, because of ultra-high interest rates and the fact that home improvement loans were not available through much of the year.

Heating

Looking at residential heating system replacements, both heat pumps and electric furnaces can be largely discounted because of their overwhelming application as new construction products. Only about 10% of heat pump shipments are replacements and the electric furnace replacement market is nearly zero.

Oil-fired installations, which have declined from 17 million homes in 1970 to something like 11 million today, reflect the expansion of the housing market in the south where the fuel has held little attraction and the OPEC-caused escalation of oil prices which has sparked wholesale conversions away from oil.

Still, there are replacements. Fuel Oil/Oil Heat and Solar Systems magazine reported shipments of 540,000 replacement oil burners last year, up from 487,000 shipped in 1979. The magazine also estimated that 432,000 of last year's replacements were high efficiency burners.

Add to these numbers shipments of 71,000 oil-fired boilers and 82,000 oil-fired furnaces, then subtract 30,300 new-home installations, and the difference is 122,700 replacement oil-fired furnaces and boilers last year.

The 1.4 million gas-fired furnaces and 296,000 gas-fired boilers shipped into the residential market last year indicate heavy replacement, conversion (383,000 last year, mostly from oil), and modernization activity.

New homes account for only about one-third of the gas-fired furnaces shipped last year and for only about one-fifth of the gas-fired boilers shipped in 1980.

New homes account for only about one-third of the gas-fired furnaces shipped last year and for only about one-fifth of the gas-fired boilers shipped in 1980.

A supplementary study conducted in 1977 by the Bureau of the Census and uncovered last year suggests a national replacement market of 5.3 million single-family home heating systems which are 20 years old or older.

The age of home heating systems follows this pattern; 17% of the systems are four years old or less; 29.7% are from four to 10 years old; 29.9% are between 11 and 20 years old; and 14.1% are between 20 and 40 years old. About 1% are more than 40 years old.

	4 years or less	4 - 10 years	11-20 years	20 - 40 years	41 years or more	Don't know	No response
U. S. total 34,600,000 homes	17.0%	29.7%	28.9%	14.1%	1.1%	5.6%	4.7%
New England 2,060,000 homes	11.6	24.7	32.5	20.2	3.0	5.3	2.7
Mid Atlantic 5,581,000 homes	10.8	24.2	32.4	20.3	1.7	5.8	4.8
E. North Central 7,497,000 homes	15.5	30.0	31.7	13.3	1.0	5.8	2.7
W. North Central 2,926,000 homes	17.0	27.7	30.1	17.1	1.6	3.9	2.6
S. Atlantic 4,988,000 homes	21.0	36.6	23.9	8.5	1.0	4.5	4.5
E. South Central 1,925,000 homes	21.0	33.9	24.4	7.0	*	5.7	8.0
W. South Central 3,021,000 homes	24.8	35.1	25.9	5.9	*	6.2	2.1
Mountain 1,714,000 homes	21.5	34.5	27.4	10.1	1.5	4.7	0.3
Pacific 4,897,000 homes	16.7	25.5	28.0	18.9	1.3	7.2	2.4

* less than 1%

Source: Bureau of the Census, 1977 Housing Survey

International

Despite economic problems at home, exports of air conditioning and refrigeration equipment have continued on a steady upward spiral that has produced a value increase of 73% since 1976. The total value of 1980 exports, according to the U.S. Department of Commerce, was $1.863 billion, or 15% more than the $1.615 billion recorded in 1979.

At the same time, there was a decrease of 7.6% in the value of air conditioning and refrigeration equipment imported into the United States in 1980. There was also a considerable difference in scale. Imports in 1980 totaled $230.7 million compared to $250 million in the previous year and $230 million in 1978.

Imports, then, represented only 12.4% of exports last year. Looked at in this way, the positive balance of trade generated by the air conditioning and refrigeration industry amounted to $1.633 billion in 1980, an increase of 19% over the $1.365 billion in 1979. This represents only shipments and does not take into account the profits to U.S. companies from subsidiaries, joint ventures, and licensing agreements which are not reinvested abroad.

The outlook for 1981 is for a continued increase in the value of export shipments in the order of 12% to 15%. Imports during the same interval should increase at half that rate and, in so doing, provide a slight increase in the positive balance of trade.

Despite the war between Iran and Iraq and other unrest, the Middle East continues to be the most important American export market. It has grown from 9% of U.S. export shipments in 1972 to 25% in each of the last two years. Western Europe and the Far East tied with a 16% share and Africa accounted for 6%.

Another major factor favoring U.S. exports abroad is the relationship of the U.S. dollar to other major currencies. The continuing strength of the Japanese yen, for example, has helped the U.S. to maintain a strong position in middle and far eastern markets where the U.S. and Japan are major competitors.

Imports

According to U.S. Department of Commerce figures, seven nations accounted for $218 million of the $230.7 million worth of air conditioning and refrigeration equipment imported into the U.S. last year. The seven:

- $107.5 million from Japan, up 7.5% from 1979, which mostly included 771,000 compressors of less than 1 hp, 413,000 compressors in the 1-hp to 10-hp range, 672 compressors of more than 10 hp, 18,000 refrigerators, 4,600 freezers, and 57,210 unitary air conditioners.
- $38.7 million from Canada, mostly including 35,000 room air conditioners, 7,800 unitary air conditioners, 28,000 absorption-type refrigerators, and 17,000 freezers.
- $20.9 million from Italy, mostly including 267,000 compressors of less than 0.25 hp, 225,000 compressors of between 0.25 hp and 1 hp, 14,000 compressors of between 1 hp and 3 hp, 25,000 rotary compressors, 2,700 refrigerators, and 19,000 freezers.
- $18.3 million from Sweden, including mostly 59,000 absorption-type refrigerators used primarily for recreational vehicles. This is down sharply from the $47 million and 155,000 refrigerators recorded in 1979.
- $14 million from Singapore, which mostly included 470,000 compressors of less than 0.25 hp.
- $9.5 million from Mexico, which mostly included 33,000 absorption-type refrigerators and $4.8 million worth of air conditioning machine parts.
- $8.9 million from West Germany, including mostly 177,000 compressors of less than 1 hp and 1,300 unitary air conditioners.

In all, the U.S. imported $98 million worth of compressors, $21.8 million in unitary air conditioners, $35 million in refrigerators and freezers, and $43 million in air conditioning machine parts.

Top markets

In terms of products exported, the Bureau of the Census prepares country-by-country breakdowns for most of the product categories listed in the 10-year look at industry shipments found elsewhere in this issue. It lists the number of units shipped and their total value.

Although we do not have the space to reprint the complete breakdown, a feel for the top markets in 1980 can be gained by looking at the top customer countries for key products expressed in numbers of units. Here are a few:

- **Compressors of 3 hp and less** (1.4 million units total): Canada

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Major export markets

U.S. air conditioning, refrigeration equipment (values in millions)

Market	1976		1977		1978		1979		1980	
	Value	% of total	Value	% of total	Value	% of total	Value	% of total	Value	% of total
Canada	233.9	21.7	232.6	18.3	298	21	307	19	310	17
Central, South America	144.3	13.4	164.1	12.9	170	12	242	15	262	14
Western Europe	181.4	16.8	195	15.4	198	14	242	15	320	16
Far East	166.2	15.4	108.6	8.5	184	13	242	15	289	16
Middle East	248.9	23	352.8	27.8	397	28	404	25	457	25
Africa	54.4	5	86.5	6.8	85	6	81	5	117	6
Other	50	4.6	130.4	10.3	85	6	97	6	108	6
Total	1,078.9	100	1,269.8	100	1,417	100	1,615	100	1,863	100

International--

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354,000; Japan 173,000; Saudi Arabia 146,000; Mexico 124,000; Taiwan 47,000; Venezuela 61,000; and Brazil 98,000.

• **Compressors of 3 hp to 10 hp** (250,000 units total): Canada 122,500; Belgium 17,000; Mexico 12,000; Japan 13,000; and Republic of Korea 10,000.

• **Compressors of more than 10 hp** (36,500 units total): Canada 7,600; Argentina 3,400; France 3,300; Mexico 2,200; and Belgium 2,300.

• **Ammonia compressors** (2,500 units total): Canada 403; India 536; Thailand 207; Ecuador 211; Venezuela 145; Mexico 123; and Colombia 119.

• **Automotive air conditioning parts** ($196 million total): Canada $113.8 million; Mexico $4 million; Venezuela and Argentina $3 million each; France $4.8 million; Japan $3 million; and West Germany $28 million.

• **Room air conditioners** (806,000 units total or 25% of U.S. production): Saudi Arabia 332,000; Arab Emirates 55,000; Kuwait 47,000; Hong Kong 46,000; Iraq 30,000; Mexico 20,000; Venezuela 17,000; Nigeria 16,000; Argentina 16,000; and Australia 11,000.

• **Self-contained heat pumps** (24,000 units total): Canada 7,000; Mexico 1,600; Libya 6,600; Saudi Arabia 1,400; and West Germany 1,400.

• **Split-system heat pumps** (20,500 units total): Canada 7,900; Australia 3,800; Kuwait 1,200; and West Germany 1,100.

• **Unitary air conditioner single packages under 5 tons** (59,000 units total): Saudi Arabia 14,600; Kuwait 6,900; Venezuela 4,200; Canada 4,800; Mexico 2,000; Ecuador 1,500; Hong Kong 3,100; and Nigeria 1,900.

• **Unitary air conditioner single packages over 5 tons** (17,000 units total): Saudi Arabia 3,500; Kuwait 2,000; Canada 2,500; and Venezuela 1,000.

• **Unitary split-system air conditioners under 5 tons** (78,000 units total): Colombia 12,000; Saudi Arabia 9,800; Kuwait 6,600; Egypt 3,100; West Germany 3,200; Venezuela 3,900; Singapore 2,400; Canada 7,320; and Mexico 2,800.

• **Unitary split-system air conditioners over 5 tons** (11,000 units): Saudi Arabia, Venezuela, and Kuwait each 1,500.

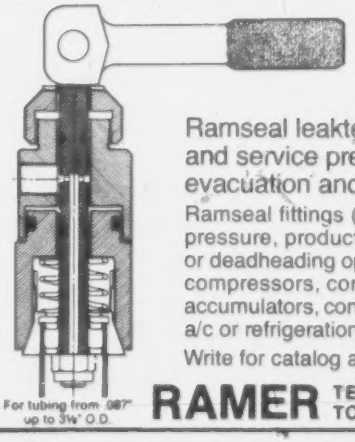
• **Central station air handlers** (17,000 units total): Iraq 3,500; Canada 2,200; Hong Kong 1,900; Venezuela 1,700; Saudi Arabia 1,900; and Arab Emirates 1,000.

• More than half as many **centrifugal chillers** as were manufactured for the domestic market were sent abroad last year. The 1,876 export units, including both open and hermetic types, went to such places as Canada (465), France (124), Saudi Arabia (133), and Taiwan (109).

• Similarly, twice as many (516) **absorption chillers** were built for export as were used in the domestic market in 1980. The Arab Emirates used 276 of them.

• Almost half as many **reciprocating chiller packages** — 3,200 in all — were exported in 1980 as were shipped in the domestic market. The biggest customers were in the Middle East, Colombia, Canada, and Thailand.

• Of the $248 million in **air conditioning and refrigeration parts** exported in 1980, Saudi Arabia accounted for $50 million; France $21 million; Canada $17 million; Iraq $14 million; and Kuwait $10 million.



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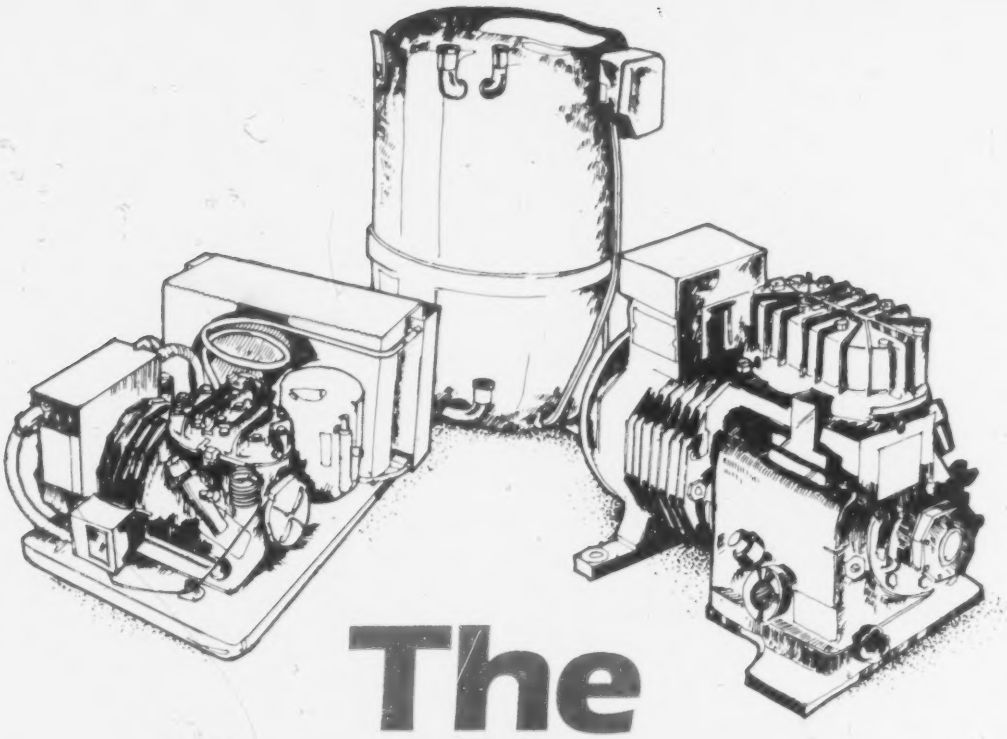

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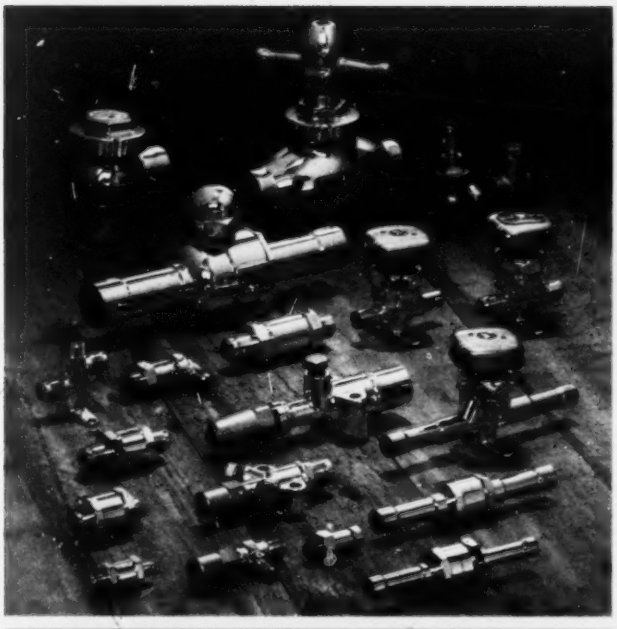

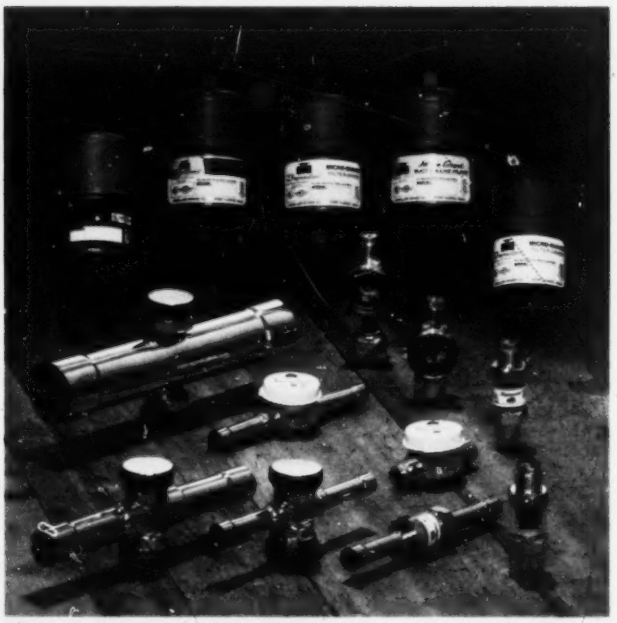

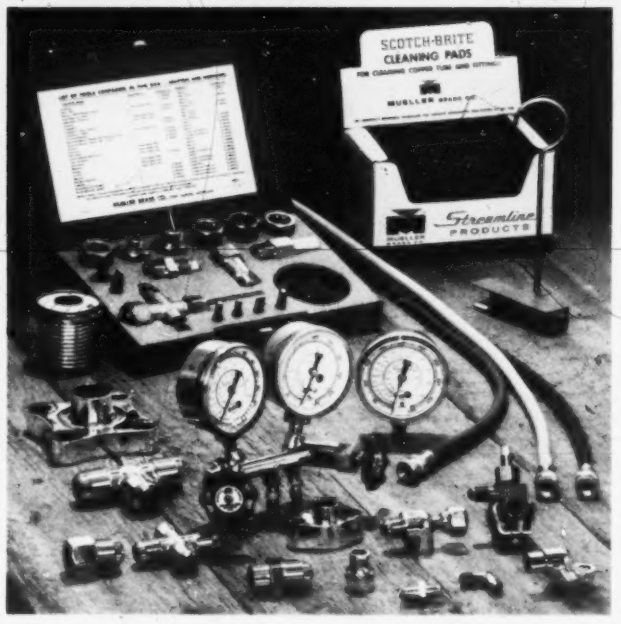

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